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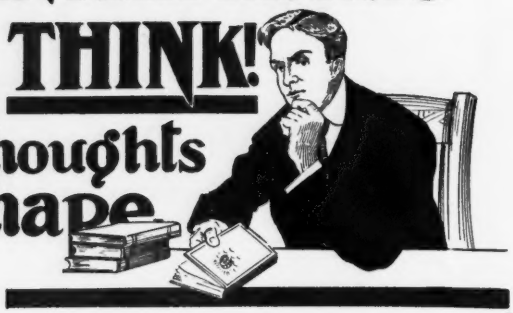

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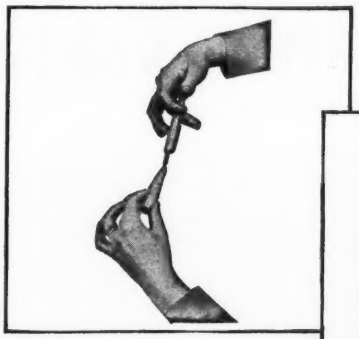

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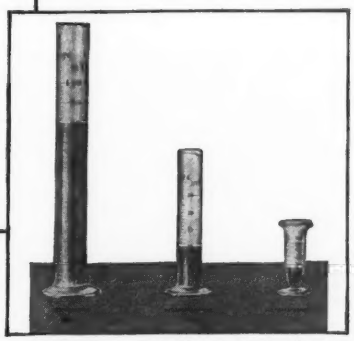

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Solmann: Manual of Pharmacology, Ed. 2, 1922, p. 581.

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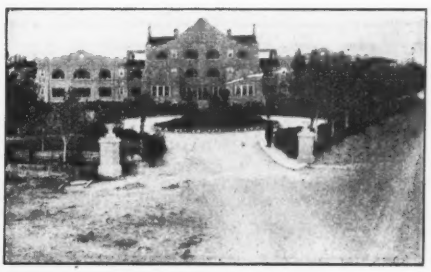

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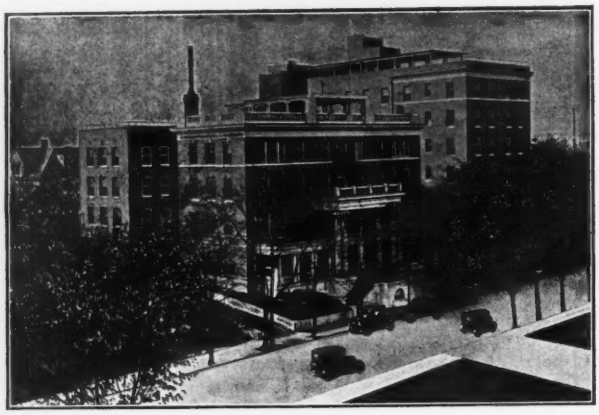

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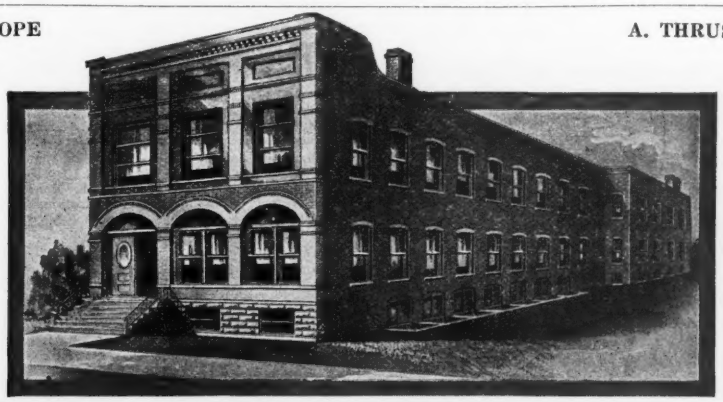

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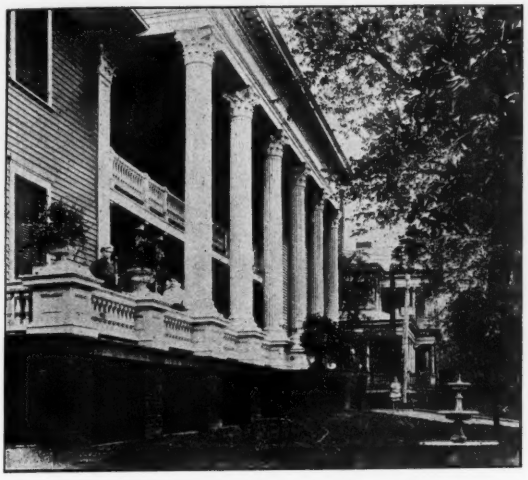

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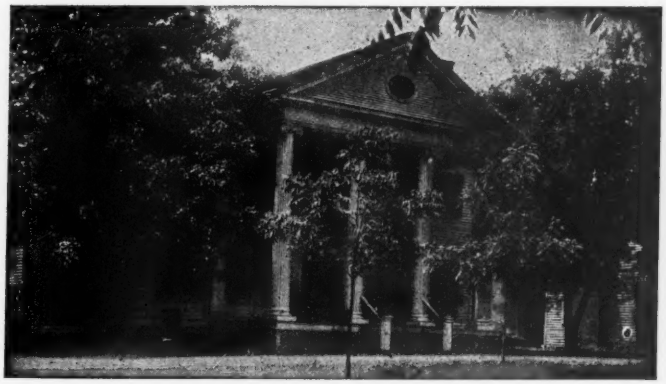

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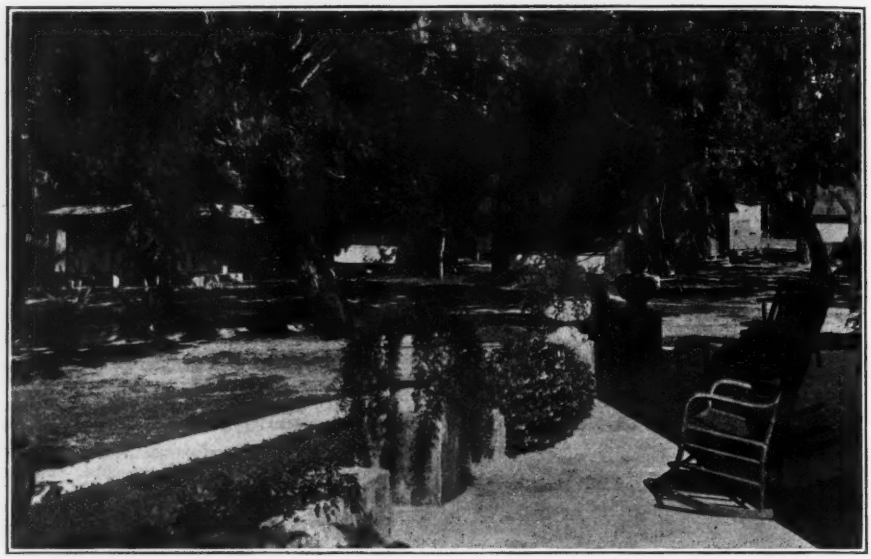

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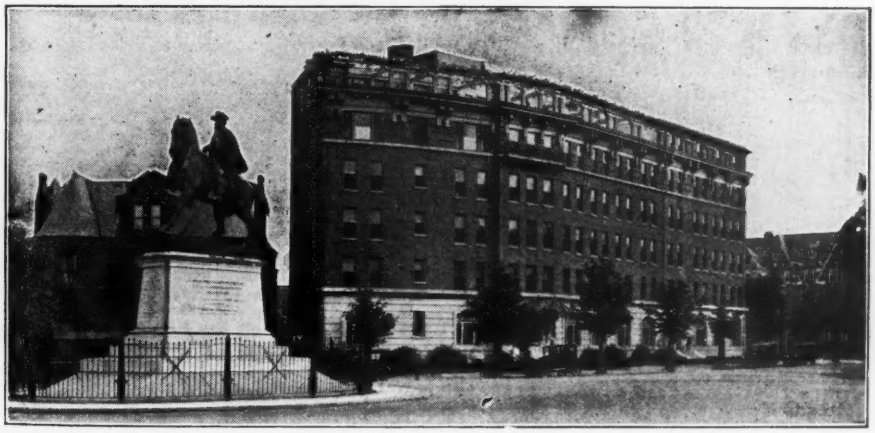

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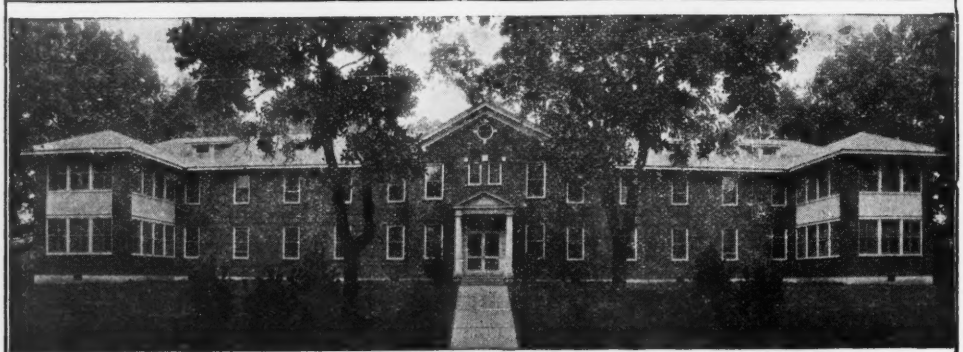

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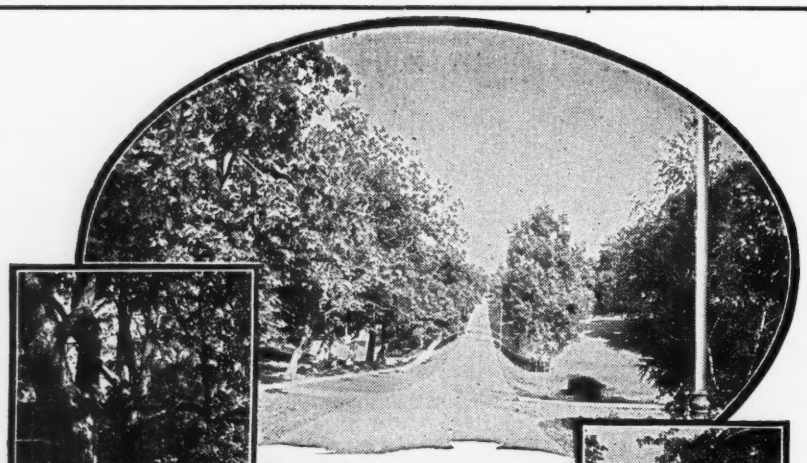

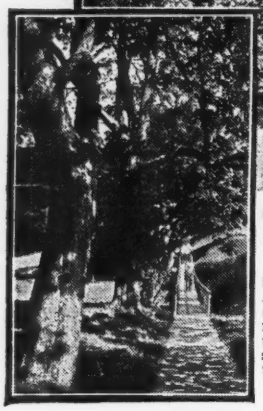

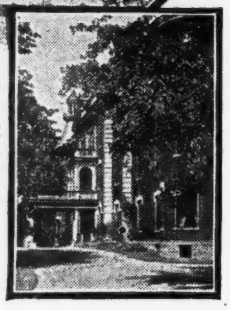

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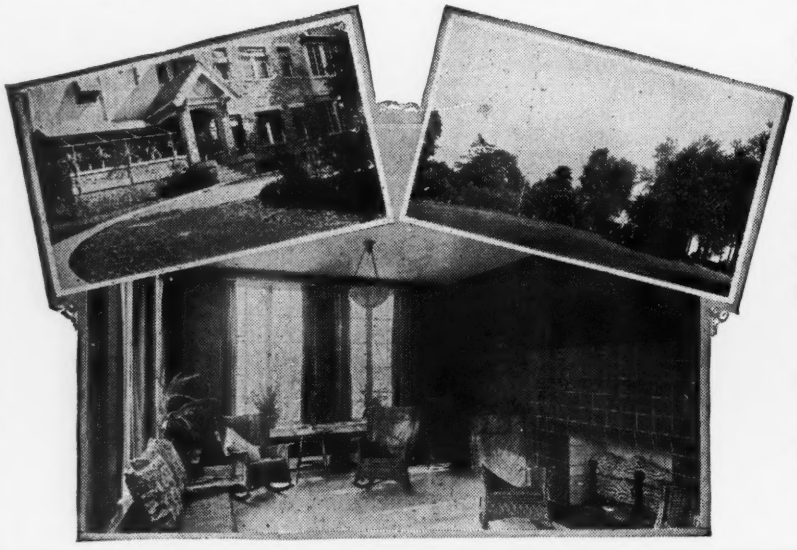

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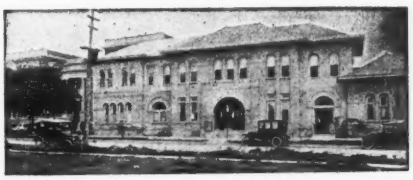

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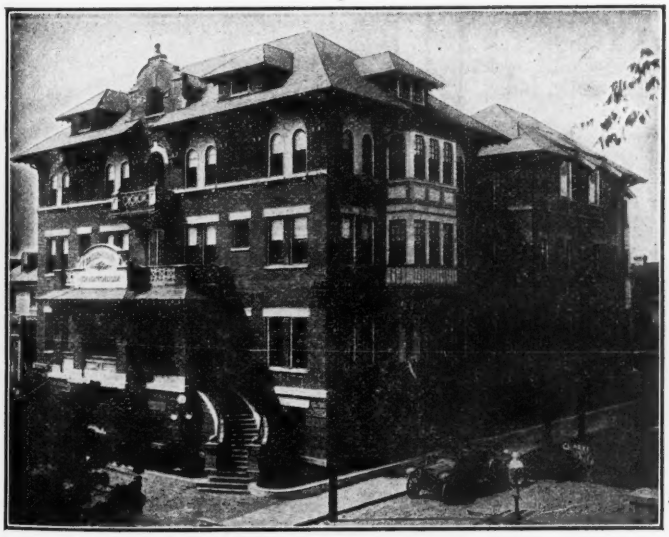

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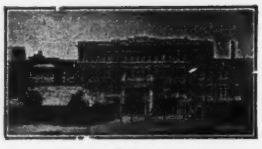

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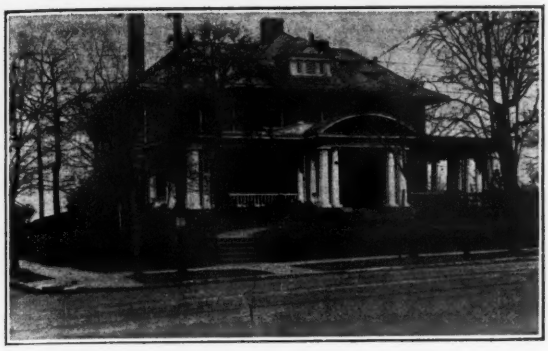

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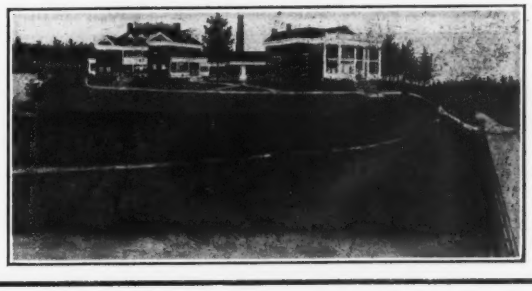

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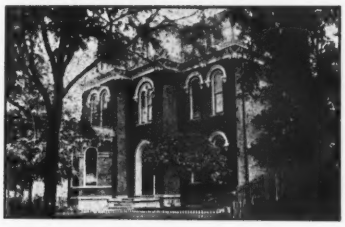

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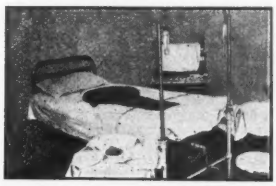

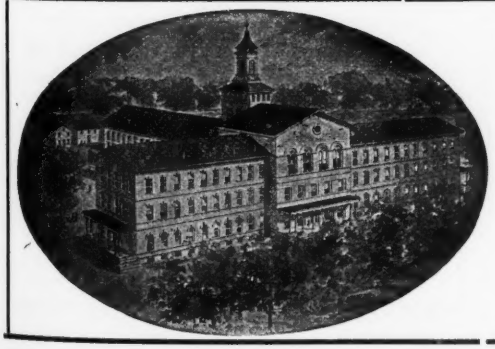

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Volume XVI JULY 1923 Number 7

MEDICINE

INTERNAL DISEASES, PEDIATRICS, NEUROLOGY, DIAGNOSTIC METHODS, ETC.

APLASTIC ANEMIA, WITH REPORT OF A CASE—DIFFERENTIAL DIAGNOSIS OF THE ANEMIAS DUE TO HEMOLYSIS, AND DUE TO HEMOPOIETIC DEGENERATION*

BY BRYCE W. FONTAINE, M.D.,
Memphis, Tenn.

The subject of this case report was a man 58 years of age, married, a Hebrew, and a salesman by occupation.

He had previously been in good health, but shortly after a heavy financial loss consulted me because of malaise, loss of strength and dyspnea. While he was well-nourished, there was present marked pallor and extreme anxiety on his part concerning his state of health.

He was a middle-aged man, well nourished, but extremely pale. The sclerae were clear. The pupils reacted to light and accommodation. Ophthalmoscopic examination showed punctate hemorrhages in both retinae. The mucous membranes were pale, the tongue was coated, and gums and mucous membrane in the mouth opposite the molars showed signs of recent hemorrhages. The teeth were in good shape, there was no pyorrhea, and the tonsils were not infected or hypertrophied. The lungs were entirely clear and the heart normal to percussion and palpation, but upon auscultation a hemic murmur, systolic in time, could be heard over the pulmonic area. This was not transmitted and was not accompanied with a thrill. The blood pressure was: systolic 140, and diastolic 80. The skin over the chest and arms showed a few small petechiae. The superficial lymph glands could not be palpated. Examination of the abdomen revealed no points of tenderness and no masses. Neither the spleen nor liver could be palpated, nor did percussion show any enlargement of the liver. Examination of the legs failed to reveal any tenderness over the bones or joints. A few petechiae were noted over the shins. The reflexes were active and the patient did not complain of sensory nervous symptoms in the feet or limbs.

Examination of the twenty-four-hour specimen of urine showed the quantity to be 1200 c. c. of pale amber color, acid in reaction, with specific gravity of 1016. There was no sugar, no urobilin; a trace of albumin was present and microscopically a few hyaline and granular casts were seen.

Examination of the gastric contents removed one hour after a Mayo test meal showed 75 c. c., fairly well digested, acid in reaction, with a total acidity of 60, and free hydrochloric acid 45. There was no lactic acid or other organic acids and no occult blood was demonstrable. Starch digestion was delayed. Microscopically numerous starch granules were seen, epithelial cells, muscle fibers, and a slight amount of mucus.

The blood count resulted as follows: erythrocytes, 1,800,000; leucocytes, 3,000; hemoglobin, 28; color index, .8; polymorphonuclear neutrophiles, 17; lymphocytes, 75; large mononuclears, 4; eosinophiles, 2; transitionals, 2; no nucleated erythrocytes; moderate anisocytosis and poikilocytosis; and no polychromasia.

In a study of several smears, no blasts of any type were seen, and while there was a moderate irregularity in the size and shape of the red cells, they did not conform to the megalocytic type of pernicious anemia. There was no basophilic degeneration. Although no total platelet count was made, all of the smears showed the number of platelets greatly below normal. The bleeding time was eighteen minutes.

Studies of the blood by vital-staining methods failed to demonstrate the presence of any skeined or reticulated red cells. The fragility test of the red cells showed a normal resistance to salt solution. Two blood cultures were made under sterile conditions, but no growth was revealed after

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seventy-two hours' incubation. The Wassermann test made from the blood serum was negative.

On account of the extreme weakness of the patient, it was not possible to obtain the duodenal contents for study. Because of the inaccessibility to an x-ray machine it was impracticable to make a radiographic study of the case.

The feces contained bile; the benzidin test was positive; urobilin and urobilinogen were not increased to any extent; and microscopical examination did not show parasites or ova.

The course of the case was rapidly downward, weakness becoming so profound that the patient was confined to his bed immediately. Almost from the beginning of the illness, the temperature became elevated to an average of 101.5° in the afternoon. The pulse rate increased correspondingly. Very early in the course of the disease new hemorrhages occurred from the gums and mucous membranes of the mouth; additional petechiae appeared on the body, arms and legs. The patient rapidly lost ground, the anemia becoming more severe. The last blood count showed 750,000 erythrocytes and a hemoglobin reading of 18.

Despite heroic efforts at treatment, in the shape of iron and arsenic by mouth, hypodermically and intravenously, and two transfusions of citrated blood from proven suitable donors, the patient died in a dyspneic attack three weeks from the beginning of his illness. No autopsy was permitted.

The clinical description of this case corresponds very closely to the description of aplastic anemia by Ehrlich in 1888, and to the later case reports of Musser, Hirschfeld, Lavenson, Larrabee, Cabot, Schneider and others. The important points in recognizing the disease are:

(1) Sudden onset and rapidity of course to fatal termination.

(2) Pallor of skin and sclerae, instead of the yellow, waxy appearance common in hemolytic anemias.

(3) Marked leucopenia, with a relative increase of the small lymphocytes.

(4) Reduction in the number of blood platelets.

(5) Hemorrhages from mucous membranes and into the skin.

(6) Absence of splenic and liver enlargement.

(7) No blasts, no polychromasia and no effort toward blood regeneration.

(8) Normal resistance of red cells to salt solution.

(9) No skeined or reticulated red cells after vital-staining.

(10) Normal gastric contents.

(11) No increase of bile pigments in duodenal contents, urine or feces.

(12) Study of bone-marrow, by means of bone puncture, showing marrow hypoplasia.

(13) X-ray examination of abdominal and thoracic viscera negative.

(14) Prolongation of bleeding time.

(15) Absence of retractility of the blood clot.

Aplastic anemia is essentially a rare disease, but confusion could arise in its recognition, and it should be differentiated from pernicious anemia, purpura hemorrhagica, malignant endocarditis, the aleukemic stage of lymphatic leukemia, the hemolytic anemias, cancer of the stomach, and cancer of the cecum.

Even today there are some who believe with Naegeli that aplastic anemia is a variety, or the terminal stage, of pernicious anemia. In aplastic anemia there is never the slightest effort toward blood regeneration as manifested by the presence of blasts of any type stippling of the red cells, polychromasia, and the megalocytic type of blood. The smooth red tongue, so accurately described by Hunter in pernicious anemia, is in marked contrast to the stomatitis and hemorrhagic areas on the tongue and mucous membrane of the mouth, usually seen in aplastic anemia. While in pernicious anemia the blood count may be as low, or even lower than is usually observed in aplastic anemia, the color index is always high. In pernicious anemia the blood platelets are not decreased to any extent; the differential count never shows the marked relative increase of the lymphocytes that occurs in aplastic anemia. The bleeding time in pernicious anemia is normal, but always prolonged in aplastic anemia. The blood clot shows an entire absence of retractility in aplastic anemia as compared with its occurrence to a marked degree in pernicious anemia. Pernicious anemia is rarely so acute as aplastic anemia, and it shows frequent remissions, and early in the course are prominent sensory nervous symptoms. In pernicious anemia the onset is more gradual and the duration of the disease is longer, sometimes running through a course of several years. In aplastic anemia, the course is progressively downward, and no measure is effective in bringing about an improve-

ment in the physical condition or in the appearance of the blood smear.

In my experience, analysis of the gastric contents is one of the most important measures in the differential diagnosis of pernicious anemia. Emphasis was laid upon this feature of the disease years ago by Stockton, and recently the study of Levine and Ladd showed its presence in 99 per cent of their 104 cases. These findings are entirely in accord with my experience and I do not consider the diagnosis of pernicious anemia conclusive, unless the gastric analysis after a test meal has shown a total absence of free hydrochloric acid.

The study of the bile pigment in the urine, feces and duodenal contents, according to the method of Wilbur and Addis and Schneider, will show urobilin, urobilinogen and bilirubin quantitatively increased in pernicious anemia, but normal in aplastic anemia.

The resemblance of aplastic anemia to purpura hemorrhagica is through the occurrence of hemorrhages from the mucous membranes and into the skin, prolonged bleeding time, marked reduction in the number of platelets and an absence of retractility of the blood clot. Even in fatal cases of purpura hemorrhagica, it is rare for the anemia to be so severe, as there is always an effort on the part of the bone marrow to regenerate the red cells, as evidenced by the appearance of poikilocytosis and blasts in the blood, polychromasia and stippling and skeining of the red cells. The white cells usually show a relative polymorphonucleosis. This disease is not so hopelessly progressive as aplastic anemia. It frequently affects the joints and the hemorrhages are more profuse.

It is possible for lymphatic leukemia to present an aleukemic stage in which the lymphocytes are not increased. The resemblance to aplastic anemia consists entirely in the bleeding gums and mucous membrane of the mouth and the relative increase in the lymphocytes. The blood of leukemia usually shows some sign of marrow hyperplasia, polychromasia and stippling of the red cells. There is nearly always enlargement of the superficial and deep lymphatic glands and the spleen.

On account of the fever and the accompanying severe anemia, it might be possible to confuse with aplastic anemia malignant endocarditis. A blood culture properly made will usually reveal the causative organism in the blood stream, leaving no doubt as to the diagnosis. The blood in malignant endocarditis shows some effort at regeneration and usually a leucocytosis, and the anemia is at no time so severe as aplastic anemia. The heart is usually much more disabled than one would expect in an uncomplicated anemia.

The hemolytic anemias are rarely so acute as aplastic anemia, and this is an important point in the differential diagnosis. The recognition of both acquired and congenital types depends upon the presence of more or less jaundice, enlargement of the spleen, a marked lessening of the resistance of the red cells to salt solution, the presence of increased numbers (over 4 to 5 per cent), of reticulated and skeined red cells, shown by the vital-staining method.

It is possible for gastric cancer and cancer of the cecum to produce an anemia so severe as to simulate pernicious anemia and aplastic anemia. This disease may occur without manifest physical signs of cancer, in the shape of pain, tenderness or tumor, in the region of the stomach. It may be entirely overshadowed by the asthenia and anemia. The blood count may be as low as in any case of severe anemia and the smear may be suggestive of pernicious anemia. We should expect the gastric contents to show an achylia, which, of course, would increase the likeness to pernicious anemia. In those cases arising from gastric ulcers, in which the gastric contents still show free hydrochloric acid, there might be some resemblance to aplastic anemia. Usually there are evidences of marrow activity in the blood picture. However, our main reliance would be an x-ray study of the stomach outline and the cecum after a barium meal and an enema for filling defects such as gastric cancer or cancer of the cecum would produce.

SUMMARY

Aplastic anemia, though rare, does occur with sufficient frequency to render.

difficult its diagnosis from several commoner diseases of the blood and abdominal viscera. No reliance at all can be placed upon the study of the blood smear alone, for it might resemble any one or several of the severe anemias.

It is possible to differentiate all of the severe anemias: those that are marrow regenerating, those that are non-regenerating, and those that are entirely secondary, as in the cases of cancer of the stomach and cancer of the cecum, by a correlation of all the physical signs, analysis of the gastric contents, quantitative estimation of the bile pigments in the duodenal contents, feces and urine, the bleeding time, the resistance of the red cells to various dilutions of salt solution, the presence of skeined and reticulated cells, when the blood is stained with cresyl blue, the total and differential blood count, hemoglobin reading, the color index, the platelet count, x-ray study of the stomach and cecum for filling defects, study of the bone marrow obtained by bone puncture, and least important of all, the study of the stained blood smear.

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DISCUSSION

Dr. C. W. Dowden, Louisville, Ky.—While bone marrow function produces a fairly characteristic blood picture, it does not always reflect the state of the marrow. Depressed or inhibited function may occur as a phase in any anemia and for the time produce the characteristic symptoms and findings of aplastic anemia. True aplastic anemia must, however, in addition to the symptoms, show an actual loss or diminution of the hematopoietic areas in the bone marrow. It would seem, therefore, that accurate diagnosis, in many cases at least, must depend upon the examination of the marrow. Recent work by Falconer and Morris, following the studies of Ghedini, show that study of the bone marrow during life is quite feasible and comparatively simple as a diagnostic procedure. Puncture of the tibia, femur or ribs is done, and enough marrow aspirated to make a microscopic study.

This work has brought to light many peculiarities as to the state of the marrow when compared with the clinical course and blood findings. They have cited instances in which the clinical course was typical as was also the blood picture, with the marrow showing the characteristic fatty changes with no areas of regenerative tissue. But in seven weeks after transfusion a normal blood picture was exhibited with hemoglobin of 62 per cent, white cells 11,500, neutrophiles 60 per cent, lymphocytes 29 per cent, and with poikilocytosis, macrocytosis, and reticulated red cells. Later the case relapsed and died of progressive anemia with purpura and marrow aplasia. There was another case typical as to symptoms and blood picture, with repeated hemorrhages uninfluenced by transfusions, and the blood showing no signs of regenerative properties, yet the marrow from the rib and the femur was not aplastic and showed regenerative areas. They believed that death was due to idiopathic purpura hemorrhagica, which was so rapid in its course that the marrow had no opportunity to respond.

That two types of anemia may exist in the same individual, presenting the characteristics of both, would seem probable from the report of Archibald, with onset, course, temperature, hemorrhage, gastric secretion, absence of nervous symptoms and remissions, as well as 1800 neutrophiles and 85 per cent lymphocytes showing 46 normoblasts with anisocytosis, poikilocytosis, polychromasia, and a lemon yellow color and sore mouth. Post mortem examination showed complete fatty replacement of the marrow of long bones and hyperplasia of the marrow of the sternum and ribs, and normoblasts and megaloblasts with mitosis, in abundance. The gastric analysis showed normal acidity and the final diagnosis was aplastic anemia. It would seem, therefore, that while the history, clinical course and blood findings will usually establish the diagnosis, not infrequently it is impossible. At a given moment blood findings that are identical may be present in several of the anemias. Intermediate cases between the extremes must be present and confusing.

The secondary type of aplastic anemia which presents much the same type of picture is recognized in poisoning from benzol, bacterial toxins, roentgen ray and radium, and probably other causes. These, of course, are modified by the primary disease and are not to be confused with the idiopathic type from which recoveries do not occur.

The so-called myelophthisic anemia in which tumors crowd out the normal hematopoietic structures, the secondary aplastic anemias, idiopathic purpura hemorrhagica, and the aleukemic phase of lymphatic leukemia, at some phase of their development probably present findings distinctly similar to idiopathic aplastic anemia and the etiology must be carefully searched for and uncovered. Therefore it would seem that we are not in a position either from the bone marrow study or from the symptoms and blood picture to say what takes place from the beginning to the end so far as the marrow changes are concerned and what is productive of the symptoms that follow. It is quite possible for us to conceive that if the hypothetical poison is intensive enough complete cessation of bone marrow function will follow, producing so-called aplastic anemia. When this poison is less intensive we may have varying degrees of bone marrow activity, producing various types of anemia.

Since the differentiation between certain forms of idiopathic purpura hemorrhagica, particu-

larly, and idiopathic aplastic anemia is difficult or impossible, and since considerable diagnostic ability is necessary to differentiate the primary from the secondary aplastic anemias, some caution should be displayed in giving an absolutely unfavorable prognosis. We feel that we are not at this time quite prepared to say that aplastic anemia is an entity, although we have no definite proof for such a statement.

Dr. William Litterer, Nashville, Tenn.—The etiology of aplastic anemia is quite obscure. Experimentally it can be produced by various chemicals such as the coal tar derivatives, high explosives, benzol, etc., and also in cases of severe sepsis. It is evidently a condition in which the blood-forming organs have received a severe shock on the one hand, while on the other there is a poisoning of some sort which causes these organs to strike.

Within the last few months we have seen a number of cases of this condition. It would seem that these cases come in groups very much as a surgeon will see quite a number of cases of appendicitis or other conditions coming in groups. At the Protestant Hospital, Nashville, my brother, Dr. J. H. Litterer, the Pathologist there, made autopsies on four cases of aplastic anemia within the past four months. All of these cases gave the identical picture as outlined by Dr. Fontaine. The bone marrow of flat bones and the heads of long bones was yellow and gelatinous in consistency. The gastric contents were nearly normal, which, I think, is a very good diagnostic symptom between aplastic anemia and pernicious anemia. I saw a case about six months ago in which a physician had given arsphenamin, thinking he was giving neo-arsphenamin. Six-tenths of the arsphenamin was given in ten cubic centimeters of distilled water without neutralization instead of in three or four hundred cubic centimeters. The injection was given intravenously. The shock was great at the time and produced unconsciousness for several hours. However, the patient finally survived the immediate injection and was able to get about the next day. He never quite regained his former strength, felt badly, and was sallow in color. I saw the case two months after the injection of arsphenamin. No blood examination had previously been made. His last illness came on acutely and prostration was the chief symptom at first, followed later by hemorrhages in different parts of the body. The blood examination showed the red blood cells about 1,200,000 and hemoglobin 25 per cent. The red cells were practically normal in contour, size and shape, but low in color. There were no normoblasts or megaloblasts. The platelets were absent. The leucocytes ran up to 75 per cent of the small type lymphocytes and about 10 per cent large. There were very few polymorphonuclears, eosinophiles and mast cells. The patient had hemorrhages and autopsy showed an aplastic condition of the bone marrow. The case was typical of aplastic anemia and probably the initial condition may have been due to the giving of arsphenamin.

About two years ago I saw a case of pernicious anemia which was typical in every way, characterized by remissions. It had typical megaloblasts, normoblasts, poikilocytosis, high color index, and everything that goes with pernicious anemia. In the last month of his illness the blood changed so that there were no blast cells left, no reticulated cells present, and the red blood cells were practically normal except that they were somewhat out of shape. In other words, the case presented a typical picture of aplastic anemia. Hemorrhages occurred and autopsy showed aplasia of the red bone marrow.

Dr. Randolph Lyons, New Orleans, La.—I have seen many cases of pernicious anemia, a few cases of purpura hemorrhagica, and anemias of other types secondary to septic poisoning, but I have never seen one that I was able to say definitely was an aplastic anemia of the idiopathic type.

In the literature there has been considerable discussion as to whether aplastic anemia was a distinct entity. At one time it was considered to be related to pernicious anemia. More recently I think the tendency is to consider it in relation to purpura hemorrhagica, for these two conditions have many points in common, hemorrhages, the bleeding time, lack of platelets and the fact that the coagulation time is not affected.

Dr. Tom A. Williams, Washington, D. C.—Very little mention has been made of an extremely important factor in the differential diagnosis of pernicious anemia. I have no experience with aplastic anemias, but I can say that in no case I have seen of pernicious anemia has there been an absence of very distinct neurologic signs. Furthermore, in a considerable number of patients there have been neurologic signs present for some time where the blood picture has been reported as completely negative; no poikilocytosis, no megaloblasts, and not even an indication of crenation of red deposits. That has occurred repeatedly in patients in whom a diagnosis of pernicious anemia has been made by myself on the neurologic signs alone. In all these cases the patient has gone on to present later a complete picture of pernicious anemia, followed by ultimate death. Frequently, in cases which are observed by internists, there is an inadequate neurologic study of the patient because the neurologic signs need not necessarily stare one in the face. There need not be any change in the deep knee reflexes. In all cases that I have seen there has been a loss of sense of attitude in the toes and the subjective sign of tingling extremities has been reported by the patient as having occurred several months or years before they came for consultation. The sign of lost or diminished sense of attitude in the toes cannot be elicited without the proper technic, and not by a mere moving up and down the toes, and asking the patient. When the test is made in a

careless manner, it is not to be wondered at that the sign may be overlooked. A normal person can always tell approximately the exact position of any of his toes or fingers, and if he cannot do so, there is something wrong, and usually that something wrong is a neurologic lesion. We know there are lesions in the spinal cord in these cases, and I suppose that in most, if not all cases, we can infer that the neurologic signs are a part of the disease and not merely a by-phenomenon. They are just as much a sign of pernicious anemia as the blood picture and are both due to the same cause.

Dr. Sydney R. Miller, Baltimore, Md.—Aplastic anemia is not infrequent in patients undergoing intensive arsphenamin therapy. Dr. Keidel has recently reported a series of six or eight such cases, and I have seen two. This, of course, suggests the importance of periodic blood studies on cases receiving this form of specific treatment. Second, there are cases of apparent aplastic anemia which recover. The analogy is similar to cases of acute infectious mononucleosis, closely simulating acute leukemia, but going on to recovery. Though true aplastic anemia seems almost always rapidly and progressively fatal, there yet remains a feeble ray of hope encouraging one to battle on relentlessly. Finally, it must ever be remembered that radium is capable of inducing bone marrow aplasia. Physicians or technicians using this, as well as patients subjected to radium emanations, must be protected from this danger by careful and frequent blood studies.

Dr. Fontaine (closing).—The case to which Dr. Dowden referred was clearly pernicious anemia because of the fact that the patient showed signs of blood regeneration and showed no definite evidence of jaundice. It might have been one of pernicious anemia which was approaching the terminal stage of aplastic anemia. Cases have been reported which have developed every appearance of aplastic anemia, but were cases of true pernicious anemia in the beginning. If there is any relation between the two conditions, this was a case of that sort.

I was much interested in what Dr. Miller said about arsphenamin. I have not seen a case of that sort. We should be careful about the injudicious use of this drug.

Aplastic anemia has been produced in some x-ray workers by improper protection of themselves, and there is a report of a prominent English radiologist who developed anemia first corresponding to the type of pernicious anemia, and finally wound up with an anemia that corresponded in every detail to aplastic anemia and died from that disease.

In our locality the disease is rare. I have never had a case before. Cases have occurred in our Municipal Hospital. My colleague (Dr. McElroy) had a case autopsied before this case was reported in which there was typical marrow hypoplasia and every other symptom corresponded closely to this case.

PARAMYOCLONUS MULTIPLEX EPILEPTICUS*

By Newdigate M. Owensby, M.D.,
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The history of paramyoclonus multiplex epilepticus began in 1881 with a description of a case by Freidreich. During the ten years that followed several cases which more or less resembled his were put on record, and in 1891 Unverricht added a family form associated with epilepsy.

Though Freidreich's disease adheres more closely to the term paramyoclonus multiplex epilepticus, it falls short of being the actual disease covered by this title, as it is not associated with epilepsy. Therefore, whenever epilepsy is present the term myoclonus-epilepsy or Unverricht's disease would be of value in the differentiation of the two diseases and should be employed.

Despite the fact that Unverricht was the first to call the attention of the medical profession to the association of epilepsy with paramyoclonus, it is interesting to note that a very good description of the symptoms is to be found in a novel, published in Paris before 1873, "In Peril of His Life," by Emile Gaboriau. Other cases which have a strong resemblance to myoclonus-epilepsy were described by Prichard (1832), Herpin (1852), Delasiauve (1858), and Hammond (1867).

Since the publication of Unverricht's description of myoclonus-epilepsy, probably not more than 120 cases have been reported, the majority of which have appeared in German, French and Italian literature. Because of this fact I shall summarize the history of a case closely resembling this condition which has recently come under the observation of the Neurological Department of Grady Hospital. The history was obtained from the patient and because of a certain amount of mental deterioration being present, many of the essential points could not be obtained.

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Of his family history he knew very little other than the fact that his father died at the age of thirty-five from typhoid fever; that his mother was living and in poor health because of some kidney trouble; that he had eight brothers and sisters living, who are healthy; and that three brothers and sisters died during infancy of unknown causes.

As to his past life he stated that he was the third born and thinks that he was a healthy child until his eighteenth month. At that time he had an attack of cerebro-spinal meningitis and for a period of twelve months he was in a semi-conscious state and completely paralyzed. At the expiration of twelve months he became conscious and within the next year gradually regained the use of the muscles of the upper extremity. He was unable to walk alone until his eighth year and then only with the aid of a cane and ankle supports. When he was sixteen years of age he contracted typhoid fever and a very slow recovery ensued. The two years following this illness he was affected with dizzy spells which closely resembled petit mal. In the summer of 1921 some financial and domestic difficulties arose which gave him much concern. These continued and he grew more and more nervous until the day before Christmas of that year, when he noted myoclonic muscular convulsions in various parts of his body. Slight giddy spells returned and late in the evening he had a general convulsive seizure which had all the indications of being a grand mal attack. After the passing of this convulsive seizure he became comatose for a period of ten hours, which was in turn followed by a period of excitement of several days' duration.

The myoclonic muscular convulsions continued since that time. They occurred at irregular intervals and varied from a few minutes to an hour in duration. No particular muscle or group of muscles were free from the seizures, except those of the lower extremities, and they had never been affected. There was no return of the epileptiform convulsion.

Physical examination showed a marked atrophy of all the muscles of the thighs and legs. The knee jerks were markedly exaggerated. In all other respects the physical examination was negative. The neuropsychiatrical examination revealed a slowly progressive mental enfeeblement.

Luminal and sodium bromid were administered and controlled the myoclonic muscular convulsions for as long as two weeks at a time.

It is the opinion of the various writers that in the development of this so-called association disease, epilepsy occurs first in one half of the cases by periods ranging from a few weeks to several years. In one-third, myoclonus appears first, and in the remainder the diseases have a simultaneous onset. The epileptic attacks are usually nocturnal at first; later they may become diurnal. As a rule the epilepsy continues throughout life, but in a few instances it exists only at the beginning of the disease. The seizures are never preceded by a sensory aura, but premonitory signs of increased myoclonic contractions are in evidence in the great majority of cases, although seizures may not always occur at their climax. The muscles most frequently involved in the epileptic seizures are those most commonly engaged in the myoclonic contractions. The sufferer is less commonly free from myoclonus than from epilepsy. In many cases consciousness is only disordered or partially lost. Melancholic-mania is fairly frequent in myoclonus-epilepsy, especially after a series of bad days.

In myoclonus-epileptics the clonic contractions of myoclonus end imperceptibly in the tonic stage of the epileptic paroxysm. The contractions are often strong and affect large masses of muscles; consequently locomotive effect is common. The trunk is very frequently affected, causing the patient to jerk the body with suddenness and violence. The face and fingers and toes are often involved. As a rule both sides of the body are affected alike. Usually the myoclonus begins in the muscles of one or both upper extremities, and in less than three months involves, in the order named, the lower extremities, chest, abdomen, neck and face. Some days the contractions are milder, some days are more severe, than others. These constitute the good and bad days. As the disease progresses the myoclonus becomes more persistent during the waking hours, and the patient may finally die of exhaustion. However, long intervals of quiet may be obtained by the use of sedatives.

Usually the people afflicted with myoclonus-epilepsy are not well developed physically and mentally. They are of dwarfed stature and their bones and muscles are not developed. Because of the difficulty in swallowing there is usually a general lack of nutrition. They are anemic and easily contract other diseases. Their mental state varies from slight mental feebleness to complete imbecility or idiocy. As for the prognosis of these cases, they may linger for a long time, but there are no actual cures on record.

So far only theories have been advanced as to the pathology of this disease. Various authors have advanced their hypotheses, but nothing absolutely definite can be asserted. Unverricht believes that the disease is due to excitation of the motor ganglia of the cord, a hypothesis essentially identical with that held by Friedreich in his original thesis on myoclonus. To account for the association disease, Unverricht assumed an additional implication of the cortical motor ganglia to explain the epileptic phenomena. Later theories have successively ascribed the myoclonic lesion to the medulla, cerebellum, corpus striatum, optic thalamus and to morbid conditions in the cerebral cortex.

Koshewnikow regarded his cases as due to circumscribed encephalitis with termination in sclerosis, meningeal adhesions, etc. Bottiger believes in its cerebral origin because of the epileptic feature and the presence of isolated muscular contractions, as in paresis and various forms of meningitis, known to involve the cortex. Krewer agrees with Minkowski and Grawitz in placing the lesion in the cortex, the process beginning as a cortical irritation and extending by continuity to ganglionic cells which preside over individual muscles. If the disease were of spinal origin, there should be trophic changes in the muscles. Murri once found lesions of the Rolandic region in a case of essential myoclonus and believes that the lesion of myoclonus-epilepsy is also cortical. Raymond, Rabot, Garnier and Santenoise, Dide, Verga and Gonzales, and Clark and Prout all have expressed similar opinions as to its cortical origin.

In conclusion it may be said that the lesion of myoclonus-epilepsy appears to be in the cerebral cortex involving the nucleus and intranuclear network of cells of both sensory and motor types. Its pathogenesis appears to be an intoxication of these cortical cells, probably brought about by a faulty chemotaxis of these same cells because of an inherent organic anomaly. While each condition maintains its separate morbid entity, the two are closely allied and indeed are often found as indissolubly associated clinically and pathologically as are the motor and sensory functions of the cells they involve.

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DISCUSSION

Dr. Beverley R. Tucker, Richmond, Va.—I agree with Dr. Owensby in the conclusion that the convulsions are due to some kind of irritability of the cerebral cortex. But we see paramyoclonus multiplex epilepticus in conditions that are congenital and we see paramyoclonus in other conditions in which there is no epilepsy. That brings me to the conclusion that possibly the convulsions are incidental and that in those cases in which there is cortical injury, convulsions occur; but the convulsions themselves are sometimes of the paramyoclonus type rather than that paramyoclonus multiplex plus epilepticus is a true entity.

We see the paramyoclonus symptom in brain tumors. I can recall one or two cases that were very marked. We also see it functionally, and I recall one case with a very marked myoclonus in a young woman who was assaulted near Richmond and who escaped from the man who assaulted her, and got hold of a pistol and attempted to kill herself. Fortunately the woman escaped a skull injury, but was brought home in a bad nervous condition, was put to bed, and myoclonus started up. She was relieved with a few weeks' rest and suggestion.

Possibly some of you gentlemen may remember Dr. Buffalo, of Jacksonville, who had an interesting case of myoclonus of the right leg, which followed a slight attack of fright while he was recovering from an attack of infantile paralysis. He had infantile paralysis when young, which at first involved all extremities. Everything cleared up except the right leg. He had atrophy in this right leg with absence of the reflexes, and all of his life after that he had myoclonus. Sometimes it was very slight. It would hardly show itself for months and months, and then would become so severe that it would interfere with his work. Rest always helped it.

The point I want to make is whether we should include in the syndrome the epileptic part, or whether that may not be simply a symptom at times of paramyoclonus multiplex.

TROPICAL SPRUE AND ITS RELATIONSHIP TO DISTURBANCES OF PANCREATIC DIGESTION*†

By Daniel N. Silverman, M.D.,
and
Willy Denis, Ph.D.,
New Orleans, La.

The more frequent occurrence of sporadic cases of tropical sprue and the alertness on the part of the profession, especially of the South, to recognize this condition is evidenced by the recent communications of Wood, Brown, Simon and others. Certain of these authors have reported individual cases, giving descriptions of the various clinical manifestations. Others have laid special stress on the most important findings in the pathological changes wrought by this disease. Wood, for instance, has spoken clearly on the blood findings and states that in the recognition of tropical sprue a close study of the blood picture is of greatest interest. The close resemblance of the changes in this disease to those found in cases of pernicious anemia often necessitates a closer study for differential diagnosis. It is maintained by some that a possible relationship exists between the two conditions in question. At the present writing this remains unproven.

Aside from the blood picture, sprue is characterized by a group of symptoms resulting from a chronic catarrhal inflammation of the entire gastrointestinal tract. A sore tongue and sore mouth are among the initial and most persistent lesions.

There are disturbances of liver function and improper pancreatic digestion. The latter condition clearly manifests itself by the invariable finding of voluminous, light-colored or white stools containing an abundance of undigested fat. Notwithstanding this fact, little attention has been given to the actual pathology of the pancreas in sprue. Therefore, there remain numerous and uncertain opinions regarding the structural alterations of this gland. In speaking generally on the pathology of sprue, Simon does not believe that the pancreas is involved in typical cases. Michel states that the gland may be small, pale and diminished in size, but finds that its structure histologically is normal with the slight exception that in parts of the organ some of the acini are congested. He believes that the secretory function of the pancreas becomes disturbed in 60 per cent of the cases as a result of invasion of the pancreatic duct. Ashford expresses the probability that pancreatitis does exist in a certain number of cases of sprue, but that the real condition is atrophy and altered function of the gland. Some few years ago, Castellani and Chambers held that the pancreas may be normal, inflamed or cirrhotic.

The first attempt at investigating the external function of the gland, in an effort to determine its possible deviation from the normal, was made by Brown in 1916. He examined the stools for the pancreatic ferments and reported an absence of all three, trypsin, lipase, and diastase. The same author, in a more recent report, analyzed the quantitative pancreatic ferments by careful study of the stools in five atypical cases of sprue. In three of his cases, the duodenal contents were also tested after removal with the Einhorn bucket. Whereas no conclusive results are given for the duodenal contents, the quantitative findings of the ferments in the stools were the result of repeated and uniform tests. Determinations were made once in one case, twice in three cases, and five times in one case. Brown's cases were of long duration, the shortest period being one year, in one case. This author does not draw any general conclusions, but feels that in certain of the chronic cases of sprue there is practically complete absence of the pancreatic ferments. Incidentally, it may here be mentioned that he therefore advocates the regular and constant administration of pancreatin in addition to the other forms of treatment, reporting some apparent clinical cures in this way.

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As to the immediate cause of these alterations in activity of the enzymes, it must now be recognized that this becomes a somewhat speculative factor in each individual case. While these disturbances may be due to a true pancreatitis or some degeneration of the glandular tissue, as has been described under the pathology of the disease by some, our observations in a large series of other types of cases have led us to believe that partial or complete inactivity of the enzymes in the duodenal contents can very well be associated with functional inhibition of the pancreas.

In this communication we desire to relate the findings of the enzymatic activity of the duodenal contents in a typical case of sprue before and during clinical improvement. Contents are always obtained under the condition of fluoroscopic visualization of the duodenal tube in the second portion of the duodenum and are analyzed by the method of McClure, Wetmore and Reynolds. Stockton thinks that this method places the testing of the enzymes on a standardized basis. Franklin White has stated that this method will give us constant quantitative results in ferment estimation which is not true of other methods. These statements are in accord with our belief after employing the McClure technic in a series of eighty examinations.

On the other hand, we would discourage attempts at testing the stools for the ferments, since this means of analysis is only approximate, cumbersome and inaccurate in the light of our present knowledge. Along this line, Strauss recently compared the values obtained by examination of the feces and of the duodenal fluids. In fifty-nine comparative tests for trypsin only five gave uniform results for stools and for duodenal fluids in one-hour tests. In the 24-hour test the results coincided approximately in 46 feces and duodenal juices. In 13 they differed. The duodenal values were more constant. Thirty-two of the 59 gave approximately uniform results for diastase. In ten cases higher ferment content values were obtained for the feces than for the duodenal fluid. The tests for lipase were constant for the duodenal contents. Lipase was not demonstrable in the feces. This writer very justly concludes that the examination of the feces gives unreliable results and may lead to errors in the diagnoses of pancreatic disease. The duodenal fluid gives conclusive results for trypsin and lipase. For diastase, the results are indefinite, but duodenal contents are at least more reliable in this respect than examination of the feces.

Isaac-Krieger maintains that examination of the duodenal fluid for ferments offers fewer opportunities for error than does examination of the feces, and that it is to be preferred to the latter method. This author contends, however, that the examination of the feces for diastase is of value as an accessory procedure.

CASE REPORT

A white male, age 44, in the employ of the United States Veterans' Bureau as an auditor, was first seen on March 23, 1922. He complained of an annoying diarrhea, an irritated mouth and a gradual decline in his health. These symptoms had endured to a greater or less degree for the preceding three years. At the onset he was compelled to leave the Philippines, where he had been in the Government service for seven years. Along with him, and because of a diarrhal condition, a friend also returned from the Islands to the United States. This individual soon died with a diagnosis of tropical sprue in the Johns Hopkins Hospital.

Our patient had gradually and steadily lost fifty pounds in weight. For short periods, varying from a few weeks to two months, the sore mouth would become much less irritating and the diarrhea would abate. During the time of his illness his mouth was always too sensitive to stand smoke which he had formerly accustomed himself to by smoking forty to fifty cigarettes daily. His bowels would move four or five times in the morning after breakfast. He noticed that the stools were very copious, light of color, and contained much gas. There were no abdominal pains and the stools were always free from blood and pus.

Previous to the onset of this illness, he had enjoyed very good health. Twenty years before, he contracted a venereal sore, but did not notice any other symptoms. Without further investigation, a diagnosis of syphilis was made and treatment was instituted accordingly. There were no other serious illnesses that he could recall. Among some of his previous examinations were three blood Wassermann tests which were negative.

His family history was negative with the exception that his only child died from an unknown cause one month after birth. His wife had had no miscarriages.

Physical examination showed a well developed but poorly nourished man weighing 126 pounds. General inspection immediately revealed a much distended and protruding abdomen. The skin was stretched in this region.

The external appearance of the head and scalp was normal. His pupils reacted to light and accommodation. There were many superficial ulcers of the buccal mucous membrane and along the margin of the tongue which was pale, smooth and clean on the dorsal surface. The teeth and throat were in good condition. The skin was moist and not discolored. There were no palpable lymph glands.

The thyroid was apparently not enlarged.

Heart and lungs were negative.

Percussion of the abdomen proved the distention to be due to gas. There was no sensitiveness on palpation.

The liver was not enlarged upward and its free edge was not palpable.

The external genitals showed no evidence of a previous lesion. There was no undue sensitiveness on pressure along the sternum, tibia and other long bones.

Knee reflexes were present.

Rhomberg, Babinski and ankle clonus were not present.

Urinalyses were negative.

The stool was very voluminous, measuring ¾ pint, practically colorless, only tinged with yellow, and semi-solid, containing quantities of gas. Upon standing, the portion of the stool exposed to the air assumed a dark gray color and after twenty-four hours there was a distinct layer of this dark material. Microscopically, there were numerous free fat globules and fatty acid crystals in each field. Repeated examinations confirmed the findings in the first specimen.

Proctoscopic examination revealed a dry rectal mucosa with a single small area of denudation, bleeding slightly.

The blood picture showed a mild degree of secondary anemia with a hemoglobin of 70 per cent.

The blood Wassermann reaction was negative.

Gastric analysis showed a normal quantity of acidity with a H-ion concentration of 1.8. The gastric mucus was in great excess and the quantity resembled that found in old cases of gastritis.

The fasting duodenal contents had a H-ion concentration of 7.2. The microscopic examination was negative.

The enzymatic activities were as follows:

(1) Lipolytic activity 0.5 c. c. (Expressed in c. c. N/10 NAOH.)

(2) Amylolytic activity 0.6 mg. (Expressed in mg. of glucose.)

(3) Proteolytic activity 0.9 mg. (Expressed in mg. non-protein nitrogen.)

This patient was immediately placed on a meat and milk diet, which consisted of one-fourth pound of lean steak and two quarts of whole milk. Medication with pancreatin, as suggested by Brown, was given in 10-grain doses with calcium lactate one hour before meals three times daily. There was an immediate improvement in the mouth lesions which subsided entirely in five days and he was able to resume smoking. The stools became formed, solid and contained no gas, numbering one or two per day. Their color remained the same. Microscopically, all specimens failed to show any free fat or fatty acid crystals. A loss of six pounds in the first week and an increase in the daily diet to two and three-fourths quarts of milk with one-half pound of lean meat was followed by a greater loss in weight of one and one-half pounds in the following week. At this stage of the treatment he weighed 118½ pounds. He could not have the benefit of absolute rest in bed on account of his clerical duties. At the beginning of the third week, Lister flour muffins was added to a daily diet of three quarts of milk and one pound of meat. His weight steadily increased until there was a gain of seventeen pounds within two months. For the first time, his stool was then cultured for the monilium psilosis, which could not be recognized.

On May 30, 1922, the duodenal contents were reexamined for the respective ferments under the same control conditions as previously and were found to correspond with the average normal case in our series. The quantitative enzymes were:

Lipolytic activity, 2.7 c. c.

Proteolytic activity, 1.3 mg.

Amylolytic activity, 1.6 mg.

The amount of lipase found in this analysis represents approximately five times its strength in the first examination, whereas the amylase and protease have each doubled their respective activities.

SUMMARY

The results of our observations in this case do not warrant any general conclusions. We have shown that the enzymes of duodenal contents in a case of sprue were present to a considerable extent during the clinical course of the disease, and that these enzymes greatly increased in strength, even up to normal amounts, during clinical improvement of the case. These facts would lead us to believe that in tropical sprue the pancreas does not always undergo extensive or permanent damage and that this gland may assume its normal digestive function.

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DISCUSSION

Dr. John L. Jelks, Memphis, Tenn.—Sprue has not been studied in this Country as it would have been if it were as prevalent as in foreign countries.

In connection with this subject I wish to refer to Aldo Castellani (*British Medical Journal*, May 5, 1921), who advises large doses of soda bicarbonate. As tropical sprue is often complicated with ameba infection, 6 to 12 injections of emetin are given, and large doses of soda given three times a day. Papain, taka-diastase and pancreatin are given. These do very little good in the early stages, but later pancreatin especially is emphasized as of value by Brown. When diarrhea is very severe, 5 to 10 grains of salol and bile salt are given. I should like to know why emetin is indicated.

Mr. Edward J. Wood says that the literature overemphasizes the tongue symptoms, which in a large proportion of cases under his observations are quite secondary to intestinal and blood symptoms.

Mayo Robson, in 1907, reported finding chronic inflammatory changes in the pancreas and some were complicated by pancreatitis. Autopsy shows atrophy of the pancreas.

The post mortem observations of Sidney Simon as to the pathology found in the intestinal tract are quite interesting and are identical with those I have found in the intestines of pellagrins, so that I have wondered if he may not have made an error in diagnosis.

Dr. Sidney K. Simon, New Orleans, La.—The role that the pancreas plays in the etiology of sprue has long been a subject of controversy. My own observations have led me to agree with Drs. Silverman and Denis that the pancreas is not a direct causative factor in the disease. Fat stools are found under many and varied conditions. In sprue, the increased fat content of the feces is most probably connected with an insufficiency of fat absorption rather than a pancreatic achylia. The tests for the pancreatic ferments in Dr. Silverman's case were conducted with scientific accuracy and each of the enzymes were found to be present in normal amounts in spite of the persistent fat diarrhea. I am inclined to believe that some of the cases reported in the recent literature have not always been instances of true tropical sprue.

To my mind, sprue is a metabolic disease, somewhat parallel to, but independent of, pellagra. As in the latter disease, there may be a combination of the metabolic factor with some as yet undetermined specific organism. Up to the present time, Ashford and Michels' observations on the etiologic importance of the monilia psilosis in sprue have not been confirmed.

Dr. J. E. Knighton, Shreveport, La.—I should like to ask Dr. Silverman whether most of the cases that have come under his observation have developed in this Country. Very often the cases seen in this Country are imported. The question arises, are we likely to find cases developing in our Country as a result of those that are imported?

Dr. A. W. Calloway, Asheville, N. C.—Ashworth and Michel have done excellent experimental work in Porto Rico, having described the changes found in this condition. Their studies have been kept up in accordance with scientific methods and their conclusions are that a yeast fungus is the origin of the disease. They have proven apparently to their own satisfaction that the administration of specific vaccines will prevent the disease, but these specific vaccines have not appealed to other authorities. Because of the fact that practically all pathologic states are prone to produce fatty fermentation of the stools, the inference has been that tropical sprue is but another example of pathology of the pancreas.

The post mortem findings, however, in typical cases of sprue have not indicated such an origin. I agree with Dr. Silverman that the quantitative analysis of pancreatic enzymes in the stool is on a very firm foundation, but the pancreatic secretion through the development of the tube method is on a much firmer and surer foundation than the other method of examination of the stool.

Sprue may be due to some metabolic disturbance. The mouth symptoms, leaning toward an acid condition of the saliva in sprue, follow closely upon the theory of Dr. Smith expressed this morning.

A recent announcement by Castellani that he had obtained therapeutic results in cases of sprue from large doses of bicarbonate of soda is worthy of notice.

As to therapy, as I remember now, I have seen five or six cases of sprue that have been materially improved by high protein diets in which the fats and carbohydrates have been excluded. No treatment is successful without a high protein diet, and you may eventually add small amounts of carbohydrates to the diet. But the fundamental plan of dietetic therapy must exclude all carbohydrates and fats.

I am more and more convinced, as I contemplate the etiology of sprue, of the close connection of such a disease with other well-known metabolic conditions, such as pellagra.

Dr. J. F. Yarbrough, Columbia, Ala.—I think Dr. Simon hit the keynote when he said that sprue was a metabolic condition. It is a disturbance of metabolism and we have the same abdominal symptoms, the same mouth, the same throat, the same gastrointestinal disturbance, the same mental derangement that we have in pellagra.

Under a strict protein diet and alkalinity, these cases of sprue recover.

As Dr. Smith suggested this morning, sprue, pellagra, and many other allied conditions are simply the result of carbohydrate intoxication.

Dr. Silverman (closing).—Pellagra is one of the diseases sometimes confused with sprue. Wood, with a very broad experience, sees no resemblance between the two conditions. The stool in sprue is very voluminous because of the great excess of calcium salts, practically white, and it contains much undigested fat. Such evidences of pancreatic disturbance are not encountered in pellagra. The diarrhea accompanying the latter is very often bloody and mucoid as a result of extensive ulceration.

I have not had a case which developed in this Country. However, Wood reports such cases from the Carolinas. Other cases have been reported as developing in Massachusetts. Like our own, Brown's cases were all foreign—3 from Porto Rico and 2 from the Philippines.

Starches are not tolerated by these patients. They soon learn to avoid them because of the distress encountered. We were able by the administration of milk and meat to get in 140 grams of fat and considerable protein every twenty-four hours.

TREATMENT OF LEPROSY*

By R. M. Wilson, M.D.,
Southern Presbyterian Mission Hospital,
Kwangju, Korea.

While this paper is primarily for consideration of the treatment of leprosy, I shall mention the various ideas of its cause.

The lepra bacillus was discovered in 1872 by Hansen, and in many ways has very much the appearance of the tuberculosis bacillus, being also acid-fast. The lepra bacillus is resistant to any culture medium so far tried. While some claim that the bacillus can be found in 95 per cent of scrapings from the mucous membrane of the nose in lepers, we have been able to find it in hardly 75 per cent. The swollen glands and ulcers are teeming with the bacilli and they can usually be found along the sheath of the ulna and perineal nerves.

SPREAD

Just how the disease is carried is still a problem to be worked out. Most of the best authorities are opposed to the idea that it is transmitted by the mosquito or other insects. However, when fed upon leprous secretions rich in the parasites, the bacilli have been found in the stomachs of these insects. It has been my idea for some years that the disease is probably transmitted by the itch mite, as the lepers usually are from the poorer classes, and unclean in habits. Most of them have scabies and here we have a portal of entry where the bacillus can be sealed up in the skin and make its growth at some later period when the proper conditions are ripe or the resistance low. The incubation period seems to vary from three months to about twelve years.

There is a native belief that leprosy is a curse from Heaven and that the only cure for this dreaded malady is to partake of human flesh. The testes are considered to possess the essential extract; and occasionally a baby's life is taken and this part eaten in the effort to find a remedy. Two men were arrested in our city for such a crime, and the police tell me that this occasionally happens.

TREATMENT

In 1908, I first used chaulmoogra oil by mouth and found that more than half the cases became so nauseated that it was difficult to continue the treatment. Many of them continued it, however, and held the disease in check in that way. In 1913, we began the injection of the oil subcutaneously and have continued to the present with very encouraging results. The oil as found in the markets is boiled and gum camphor added to make 1 per cent of camphor. This is injected into the buttocks weekly, starting with 3 c. c. and working gradually up to 7 or 8 c. c., according to the endurance of the individual. The treatments are given on Saturday, all rest over until Monday morning, and there is very little complaint of pain or interference with work. Occasionally we get an abscess, which is due to improper technic. Our lepers have been trained to give treatment themselves and this might happen occasionally in their hands. We feel that we get recovery in about 8 or 10 per cent of the cases coming in early stages of the disease, and the disease arrested and held in check in probably 60 per cent. As many of the cases have tuberculo-

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sis, lues and other complications, one could hardly expect improvement in all cases.

Our cases are divided into three classes: (1) those taking the oil and camphor; (2) those taking the ethyl esters as made by the Rockefeller Foundation; and (3) the ethyl esters made by Dr. Shega, of the Japanese Government in Seoul.

New cases show marked improvement with either of these methods, but our best results have been gotten from the chaulmoogra oil and camphor. In the chaulmoogra oil we have not only the ethyl esters, but other properties of the oil, and we feel that our best results are obtained from the oil itself. For about two years we used sodium gynocardate as made by Rogers, in Calcutta, but with no appreciably results.

Fig. 1.—This shows the process of amputation in leprosy. In about three months longer this foot would have been amputated. No pain and very little hemorrhage, though there is usually discharge, and this is very likely the way the infection is spread. Nearly every leper has some open ulcer on his foot.

Fig. 2.—A very bright little girl in the leper home, an extensive tubercular type. The disease has gained so before entering that she can probably never be restored to health. So often a mother is ashamed to let it be known that her child is a leper and they are kept in hiding until it is too late to help them very much.

General hygienic care, baths, tonic and proper diets are very essential in the treatment. Many lepers come to us very weak and run down and in miserable physical condition, and after a few months' care and treatment they regain their strength and are able to carry on heavy manual labor. We require that every leper who is physically able must take some part in the work and care of the institution, even if it is no more than digging in the garden.

We have been able to train our lepers for various industrial lines of work such as carpentry, masonry, brick and tile making, weaving, farming and other industrial lines; and these activities are important in the treatment for giving the proper exercise, limbering up the stiffened or contracted joints and muscles, stimulating better appetite, and helping to make them forget and cease brooding over their condition. We consider these activities a very important part in the treatment.

After having been on the injection treatment for months some of our cases

find that they can take the oil by mouth and continue in good health. At Carville, La., they seem to feel that their best results are obtained by large doses of the oil by mouth, some taking enormous doses such as 60 minims, three times a day.

Last March (1922) we parolled ten cases as probable cures. They were examined and all evidence of the disease was absent. They will be examined on our return to the field in September for any recurrence of the disease. Of the 180 cases parolled from Hawaii as cures,

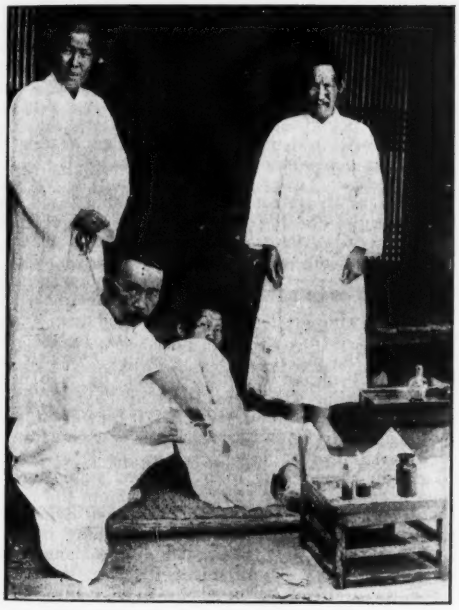

Fig. 3.—Our home-made leper doctors giving the injection of the chaulmoogra oil. They care for the sick, do the dressings and all minor medical work, some minor operations like amputations, etc. They are quite skillful with the microscope and can diagnose the more common diseases.

only 8 per cent showed a return of the disease after one year's time, so this offers very great hope of cure.

P. Hopper says: "The favorable results of treatment at Malokai have been due to the general hygienic treatment and to the intramuscular injection of chaulmoogra oil, mostly by the Mercedes method." He has used also with good results the intravenous injection of chaulmoogra oil 500, sulphuric ether 500, and iodin gr. 1.

There is no doubt that we have in chaulmoogra oil a specific for leprosy, and that with patient, prolonged and persistent treatment, encouraging results will be shown. The best results will be shown in the young and in the early stages of the disease. The general and hygienic measures should be insisted upon, especially a regular and systematic form of exercise or labor.

DISCUSSION

Dr. Victor G. Heiser, International Health Board, New York, N. Y.—Most of us here in the United States, who live among comforts and luxuries such as are not enjoyed in any other country, do not realize that throughout the habitable zone of the world we have representatives who are doing fine work amid trying conditions. It has been the custom to decry the efforts of medical missionaries, but I have seen a great deal of the work done by missionary doctors and I want to take advantage of this opportunity to pay them tribute. They may not be specialists, but their talents are many. For example, I found Dr. Wilson doing surgery, doing good work in leprosy, establishing leper colonies, building hospitals, building roads, and doing it all splendidly.

While I was Director of Health for the Philippine Islands I had unusual opportunities to study leprosy, and since then I have visited many leprosariums in various parts of the world. Personally, I do not regard a leper as cured until he has been free from the disease, clinically and microscopically, for a continuous period of at least two years. I have seen a number of cases that remained negative for ten or twelve years. The treatment introduced by Dean, Hollman and McDonald, in Honolulu, is doing great good, and within a year or two we ought to have some very definite figures as to its value. The experience in Honolulu shows that apparently 20 per cent of lepers can be cured with the ethyl esters provided the disease is not of more than five or six years' duration and the cases are not beyond young adult life; 50 per cent undergo a cosmetic recovery or are greatly improved clinically, but the leprosy organism does not disappear, in 20 per cent the disease is almost completely arrested, but the cases show no signs of improvement, and the remaining 10 per cent are apparently not affected.

Dr. Wilson, as I remember it, was using chaulmoogra oil with camphor, and was getting results comparable with the ethyl esters.

Dr. J. B. Shelmire, Dallas, Tex.—Am I to understand that chaulmoogra oil was used in leprosy a hundred and fifty years before Christ? I find that many physicians are under the impression that chaulmoogra oil is a recent discovery. While I was an interne of the Charity Hospital, in New Orleans, in 1881, the remedy was used in all cases of leprosy.

Dr. J. L. Kirby-Smith, Jacksonville, Fla.—Some five years ago I saw a very beautiful case of macular leprosy. Quite a few cases originate in Florida, especially in the lower part of the peninsular, and some five years ago, as I stated, I saw this case of maculo anesthetic leprosy. The patient was a young man seventeen years of age. The father was in fairly good circumstances, and I suggested to this young man that he move North. He went to Indianapolis. He was a fine boy, and intelligent, and I insisted that he get a job and do some heavy work. I put him on strychnin and tonics. I saw him three years later and he then had no sign of leprosy on his body. Two years after that (this year) he developed some sickness and developed nodular lesions about the face that any one could recognize. He is now a patient in the National Lepra Sanatorium in Louisiana. Of course, we all know that general medical treatment will help some. In the last year and a half I have had in my office three cases of nodular leprosy which developed in Florida. I believe we could promise almost a cure if we could get these cases early and use chaulmoogra oil and x-ray with good general medical attention. The patient first cited was a case of positive leprosy, and the change of climate from Key West to the North, and general medical treatment along with heavy mechanical work, arrested the disease.

Dr. Earl D. Crutchfield, Galveston, Tex.—We see some leprosy in Galveston. In a recent survey we found twenty-six cases that had developed on Galveston Island. Those cases had developed from nine different foci. All of the cases could be traced to nine different areas in the city where, at one time or another, some of these cases had lived.

In 1913, Dr. Singleton started treating these cases with chaulmoogra oil. They were given a mixture of chaulmoogra oil and some volatile oil with camphor, and were given as large doses as 20 c. c. Considerable pain is caused by the injection, and as they got better they would drop it. In 1918, they were rounded up again and we began the use of sodium gynocardate. We have treated approximately twenty-six of these cases, taking it in the nodular type and the macular and anesthetic types. Taking all types into consideration, we have found this to be a fairly satisfactory method of treatment. In the beginning of the treatment nasal smears are made in all cases. At the end of two years, in over half of the cases, we are unable to get any positive smears. In over half of the patients with the nodular type we were not able to find any lepra bacilli, particularly in young individuals, with macular leprosy. We feel that in two years' treatment we have probably gotten a cure, but just in the last few months one of those cases that we thought was a cure appeared at the clinic with what seemed to be an erythema nodosum. However, because the patient had been a leper a biopsy was done, and we found the nodules to be leprous.

We have given from 1 to 5 c. c. of the sodium gynocardate intravenously, and for the last six months we have been giving the ethyl esters of chaulmoogra oil. We have found that the cases, particularly the fulminating type, have been made worse at first by the use of the ethyl esters. The patients complain of extreme dyspnea after injection and they are put in bed sometimes for several days. Of the private patients we have some who have been receiving the injections for over a year, and the nasal smears in three of these patients are now negative. With the early paresthesia we have been able to relieve the pains in the legs and arms. In two negro boys who had macular leprosy the sensation has returned. We are able in many cases to get nice clinical results, but a great many cases come back later.

Dr. William Allen Pusey, Chicago, Ill.—It seems to me that the work that has been done in leprosy in the last few years is portentous. Leprosy until lately was regarded as absolutely beyond us, but now the men working in leprous districts have found that something can be done for the disease. The work in the Orient and the Sandwich Islands has shown that there is a chance of arresting the disease in many cases and getting a symptomatic cure in many more. This is a portentous fact, and I believe that the recent work in leprosy will prove to be one of the great achievements of medicine of the early part of the Twentieth Century. The various methods of treatment that are being used are subsidiary. The big fact is that some leprosy is being cured. All of this work has been done by Government officers or by missionaries, and I have the greatest admiration for the men that have been doing it. The results are not the product of us who are easily situated and have every facility at hand. It has been done by men at work in the field. I had occasion recently to review a book on leprosy written by a British officer of this sort. He took up leprosy in a way that showed you that his information was based upon first-hand experience; how to arrange leper settlements; how to house the lepers; how to clothe them; how to give them employment; how even to prepare the remedies from the crude material. These men in the field are doing the work all of the way through, are doing it well, and they have my unbounded admiration. This Section, I think, should pride itself upon having upon its program a paper by one of these field workers who brings us direct information of what is being done.

Dr. William H. Mook, St. Louis, Mo.—Leprosy is essentially a disease somewhat analogous to syphilis. It affects all the organs and all parts of the body. I think the eventual treatment will be some serum or antibody similar to vaccination that will cure or prevent it.

The unfortunate thing in the United States is that once the diagnosis is made the patient becomes an outcast. They are not subject to that sort of thing in foreign countries. I was talking to Dr. Crutchfield about the leprosy situation down in Galveston, and he says that practically all the lepers are among the foreign inhabitants. In New York City there are probably seventy-five or one hundred lepers, and none of them is native-born. They are foreigners, imported cases.

Our Government, sooner or later, will have to establish a leprosarium somewhere, where all of

our American cases can be isolated. They are doing that work now and are sending the cases to Louisiana. The work of the missionaries is bringing to us more every day the necessity for that, because it is one disease that has been isolated and its spread limited by isolation. In the course of time all the cases will have to be isolated.

Dr. Victor G. Heiser, International Health Board, New York, N. Y.—In connection with the treatment of leprosy, it is very curious that the ethyl esters of chaulmoogra oil apparently produce widely varying results in different parts of the world. For instance, the ethyl esters of the same lot as those used in Hawaii did not produce good results at the Government Leprosarium at Carville, La., and at the leper hospital at San Francisco, Calif. On the other hand, the results in Hawaii and the Philippines were satisfactory. Several cases treated recently in London with the ethyl esters did not respond satisfactorily to the treatment. I know of no explanation to account for these differences.

The encouraging thing about the whole problem of leprosy is that there is actual scientific research going on in different parts of the world with regard to it. Up to ten or fifteen years ago very little work of a really scientific nature was being done. Just what can be accomplished by modern medical science is well illustrated in the developments of the treatment for leprosy. It is one of the achievements of the early years of the Twentieth Century that we have made some progress in treating this disease, which has afflicted mankind since the beginning of time.

Dr. Wilson (closing).—I would like to show you this picture of a syphilitic whose face, one eye, nose, etc., were destroyed. This shows what a syphilitic will come to if untreated. We took him into the leper hospital, as he could not live long, and the lepers said: "That is not our disease, but some bad condition. That fellow is really sick."

I have seen cases of syphilis showing far greater destruction and making far worse appearance than that of any leper who has ever come to us.

I believe that syphilis is a far greater menace and problem to this Country than leprosy. There is a great possibility of eradicating leprosy from some of these lands and the world if undertaken properly, but no such hopes for syphilis, it seems to me.

As to the use of ethyl ester, I have seen no change at all after six months' treatment with ethyl ester on old cases previously treated by the oil injections, but a new case will respond readily and you will see improvement after a few months' treatment with either. I believe that the treatment with the oil is better, because in it you have the ethyl ester and probably other important ingredients.

I have my cases divided into three sets at present, one-third on chaulmoogra oil with 1 per cent camphor, one-third with ethyl ester as manufactured by the Rockefeller people in Peking, and one-third on ethyl ester as manufactured by the Japanese Government in Seoul by Dr. Shiga.

Some very encouraging reports have been received from the use of chaulmoogra oil. One case that I sent out three years ago and forgot to mention has been well for three years. He came back this spring and we took his picture, and he showed no evidence of the disease at all. That is one case I have noted that shows no return of the disease after three years' time. He became a school teacher, married, and is now in perfect health.

A CASE OF CONVULSIONS FOLLOWED BY AMNESIA*

BY PHILIP F. BARBOUR, M.D.,
Louisville, Ky.

As old age approaches, memory gradually grows less trustworthy and reliable. Psychologists tell us that memory is a complex phenomenon, and that the loss of memory passes through four stages. These are quite definite and are as follows: (1) loss of memory for recent events; (2) for ideas; (3) for emotions; and lastly (4), for actions.

The old man recurs most often to experiences of early life and forgets recent events. His ideas are meager and limited. The natural affections grow colder and they become more self-centered. Action gradually disappears. Ribot, in his "Diseases of Memory," states that the same sequence may occur as a result of diseases or accident. He records many interesting cases illustrating various kinds of forgetfulness. One was that of a German who came to this country and acquired a good use of English, and as a result of a blow on the head, forgot English entirely, his most recent mental acquisition, but remembered German perfectly. The simple is remembered more easily than the complex because less differentiated and more often repeated in experience. Muscular activity is the lowest mental process, and therefore most persistent in memory. Ribot points out that memory returns in exactly the opposite order to its loss.

A little girl aged sixteen months was seen in July. She had had a long and severe convulsion four days previously and slighter convulsions off and on afterward. She had had a rather more

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severe convulsion shortly before I saw her. A large enema brought foul feces, the temperature dropped to normal and there had been no more convulsions.

The first examination revealed no paralyses, all reflexes were normal, and she showed active resistance to all the handling necessary for examination. There were no aural or other symptoms to indicate any localized cerebral lesion then or afterward. Six weeks later she came to my office with the additional history that she had gradually learned again to walk and feed herself, such actions being largely under control of the sub-conscious brain. For some time she did not differentiate between her parents and strangers. Her expression was rather blank and she did not speak any word. After that time her mother wrote that she knew the members of the family, was bright and playful, and was learning words again in the order that children usually pick up words.

Words show a very high degree of mental development and association and will naturally be acquired more slowly.

This child, as a result of a severe convulsion, lost her memory for words, her recognition and affection for her parents, and her physical coordination. They returned to her in the reverse, order as would be expected.

What the nature of the damage was and its location cannot be determined. Exactly similar symptoms with reference to the memory may result from disease or injury. The prognosis in this case is good. We so often see permanent paralyses or mental impairment follow such traumatism of the brain as occurs in convulsions, that this case with slightly different mental symptoms is reported, that we may have a wholesome respect for a symptom that is sometimes minimized.

DISCUSSION

Dr. Owen H. Wilson, Nashville, Tenn.—I am glad to hear Dr. Barbour emphasize the after-effects of convulsions. This convulsion probably was of toxic origin. We are too apt to say after the convulsion is over that there will be no after-results, but we do not know. There may be some damage to the brain. We cannot locate the center of memory even approximately. We may find after convulsions some lesion, usually cortical, which may result in more or less permanent disorder. Convulsions, toxic in origin or from any cause, may produce brain pathology and the beginning of epilepsy. I hope Dr. Barbour's case will be permanently well, but I would not be too sure.

Dr. John Zahorsky, St. Louis, Mo.—We have many factors producing convulsions in children, for instance, toxic convulsions which are not followed by bad effects. I am not saying that convulsions cannot produce hemorrhage in the brain, and we know that hemorrhage in the brain produces convulsions. But it is the brain lesion that causes the convulsion and not the convulsion the brain lesion. The fact that there was a slight spasticity of the calf muscles in this case would show that there was a lesion in the brain which caused the convulsions.

Dr. A. G. Jacobs, Memphis, Tenn.—We are familiar with the effect of toxins on the baby's cerebrum. We know they can show any symptoms from a mild delirium to convulsions and complete unconsciousness. I am inclined to think that most of these are purely toxic, that there is no real pathologic lesion; only an irritation of the cortex by the absorbed toxin or from other toxins. We may have a prolonged irritation of the cortex from toxins without any pathologic lesion, lasting for days. Convulsions do not produce these lesions, but the same thing in my opinion which produces convulsions is responsible for many other manifestations on the part of the cerebrum.

Dr. Barbour (closing).—It is very difficult to determine whether a convulsion will result in an injury to the brain. There are many cases in which the convulsion has come, probably in connection with a toxic condition in the intestine and where the damage has occurred in the brain at the same time. This can result from severe toxemia causing either hemorrhage or some other lesion in the brain which may be permanent. We have all seen children who had convulsions with no evident lesion in the brain or other bad after-effect. This child had peculiar mental symptoms; no paralysis, but simply transitory disturbances of memory. I suggest that we might watch for effects of convulsions other than the more obvious one of paralysis.

A CASE OF CONGENITAL SYPHILIS WITH ASCITES*†

By Ralph C. Spence, M.D.,
and
L. C. Tittle, M.D.,
Dallas, Tex.

Randall C., a white male, age 15 years, came under our observation January 5, 1922, complaining of enlargement of the abdomen, marked emaciation, and loss of motion in his joints.

Family History.—The mother and father were both living and well. There was one sister, age 17 years, living and well. The mother had one miscarriage at six months, her first pregnancy. The next pregnancy was full term, but the child

*From the Medical and Surgical Clinic.

†Read in Section on Pediatrics, Southern Medical Association, Sixteenth Annual Meeting, Chattanooga, Tenn., Nov. 13-16, 1922.

died in infancy. The father admitted having had a chancre when a young man, and seven years previously he had had a nervous breakdown, which cleared up under anti-luetic treatment.

Patient's History.—The delivery of the patient was normal and the cord healed promptly. He was a normal baby until two months old. At that time he started to vomit frequently. He continued to have frequent gastrointestinal upsets and was pale and under weight until he was two years old. His teeth came late and he did not walk until after he was two years old. At 5 years of age he developed "iritis." At 6 years his adenoids were removed. Soon after this operation he developed the measles and his left eye became infected. This was opened and drained three times and was diagnosed as chronic dacro-cystitis. Three years previous to our observation a tumor appeared on his sternum. This ruptured spontaneously, healed once or twice later, and then ruptured again. Two years previously he developed an ulcer on his forehead and there was one in his mouth when he first came under our observation.

Three months previous to our observations he vomited blood several times. A few days after this his abdomen began to increase in size. About the same time his joints became sore and painful, but not red. There was no elevation of temperature. His appetite was poor and his bowels regular. He had been bed-ridden for three months, during which time his abdomen had slowly increased in size, and the emaciation of his extremities had become more marked. He had been treated by many physicians for many things, especially lues and rickets.

Physical Examination.—As will be noted in the slides, the patient was poorly developed and poorly nourished. His abdomen was greatly enlarged and his extremities were markedly emaciated.

The movements of his eyes were normal. The lacrimal duct on the right side was stopped up and tears escaped over his face as a result. There was some cloudiness of the cornea on this side. Both pupils reacted to light and distance. The hair was dry and course. There was some seborrhea of the scalp with a moth-eaten appearance in places. The skin was pale and dry. There was a scar 1 cm. in diameter just to the left of the midline of the forehead, the border of which was attached to the bone. There was an ulceration 2 cm. in diameter over the sternum and right sterno-clavicular joint. This ulcer had a pink border and the underlying bone was involved. The tongue protruded to the right. The papillae were prominent and the breath was foul. There was marked pulsation of the vessels in the neck. The heart was apparently enlarged and pushed upward. There was a loud blowing systolic murmur over the whole precordium which was loudest at the base.

Both elbow joints were ankylosed with the forearm at right angles to the upper arm. The motion was limited to from 40 to 60 degrees. There was some tenderness of the right wrist with limitation of motion. All the finger joints were swollen. Both knee joints were enlarged and the knee caps were floating. Motion in these joints was painful, but not limited. The muscles of the extremities showed marked atrophy. The reflexes, both superficial and deep, were normal.

The blood Wassermann was strongly positive. The hemoglobin was 38 per cent. The red blood cells were 2,430,000. There were 6800 leucocytes with a differential of 67 per cent polymorphonuclears, 19 per cent small lymphocytes, 11 per cent large lymphocytes, and 3 per cent transitionals. The urine showed a trace of albumin with an occasional hyaline cast.

Treatment.—The abdomen was tapped on eight different occasions during the first three weeks after the patient came under our observation. From 400 to 500 c. c. of a thick, turbid, straw-colored fluid, slightly alkaline, with a specific gravity of 1012, were obtained at each tapping.

Because the abdominal fluid bordered between an exudate and a transudate a pneumoperitoneum was done with this report: "There are no adhesions of the intestines to the abdominal wall. The liver is slightly enlarged and lobulated, giving a very irregular contour to the lower border. There is still some fluid remaining in the abdomen. The spleen is not markedly enlarged. The kidney shadows are overshadowed by fluid."

The patient was given the maximum doses of potassium iodid and protiodid of mercury by mouth. Neoarsphenamin was given intravenously. After three weeks' time the fluid no longer accumulated in the abdomen. Since then there has been marked improvement in every way. At present the patient is going to school and his activity is that of a normal boy of his age.

DISCUSSION

Dr. Charles Boynton, Atlanta, Ga.—Ascites in connection with syphilis is a very rare condition. I do not recall ever having seen a case where the patient had the two conditions. In this patient the edema was over the entire body and the abdomen could not escape. In two minutes, of course, one cannot attempt a discussion of congenital syphilis.

TROPICAL DISEASES AND PUBLIC HEALTH

VIRULENT DIPHTHERIA BACILLI ISOLATED FROM CHICKENS SUFFERING FROM ROUP*†

By William Litterer, A.M., Ph.C., M.D.,
Professor of Bacteriology, Vanderbilt School of Medicine,
Nashville, Tenn.

In the literature there is no reference pertaining to the demonstration of virulent diphtheria bacilli in fowls. Such a finding opens up a new field as a means of dissemination of the Klebs-Loeffler bacillus. Various animals such as the cat, dog, and even the horse, have been suggested from time to time as carriers of the infection.

Considerable reference is made in the literature to cases of diphtheria occurring especially in cats. Thirty years ago Klein[1] described lesions in cats which he considered typical of natural infections with the Klebs-Loeffler bacillus. Low,[2] in 1888, reported the occurrence of four cases of diphtheria in one house which he thought had been carried by a pet cat from another case in the same neighborhood. Cultures from this cat contained morphologically typical Klebs-Loeffler bacilli. Karlinski, in 1908, published observations of an outbreak of diphtheria which resulted in the death of seventeen out of twenty-four Angora cats. He stated that typical pseudo-membranous lesions were found from which he isolated virulent diphtheria bacilli. He also reported a number of cases of diphtheria in children who were infected after contact with sick cats. Probably the most convincing article concerning the cat as a carrier is by Major Simmons.[3] He isolated diphtheria bacilli, virulent for guinea pigs, from two cats which were pets of a person who contracted a fatal diphtherial pharyngitis. Stray animals of the same species caught in the environment gave negative cultures. These bacteriologically controlled observations, including the suspected human victim, lend a greater probability to the long-heralded impression that cats may contract diphtheria from human subjects and that in turn these animals may communicate the disease to man.

The beginning of my investigations came about in a very unique manner. To Dr. W. T. Robinson, of Murfreesboro, Tenn., is due the credit of calling attention to the fact that chickens suffering with roup simulated human diphtheria. During the fall of 1921, Murfreesboro, Tenn., with a population of about 6,000, situated thirty miles from Nashville, was visited with a severe epidemic of diphtheria, during which many of the schools were closed. On October 16, 1921, Dr. Robinson sent me four swabs obtained from the throats of chickens suffering with roup. To my surprise they contained the Klebs-Loeffler bacillus, which subsequently proved virulent to guinea pigs. Later, six other swabs were sent with similar findings.

I wrote Dr. Robinson requesting that he furnish all available data at his command concerning the roup-diphtheria outbreak in the fowls. In December he wrote the following:

> "This epidemic of roup from which I have sent you about a dozen specimens occurred among fowls owned by Fox and Potter, neighbors, whose poultry yards are in apposition. Mr. Fox has 75 fowls. Among this number eleven developed roup and six died from the disease. Three chickens were treated with 500 units each of diphtheria antitoxin and all recovered promptly.
>
> "Mr. Potter had thirty fowls and ten were infected with roup. Five died and three were treated with 500 units each of diphtheria antitoxin. Two recovered promptly and one died. The one which succumbed was practically moribund at the time of administration of the antitoxin." Dr. Robinson further stated that in making cultures from the throats of school children in the city, a girl in the Fox home about thirteen years of age was found to be a carrier, and also a boy about sixteen years of age from the Potter home. There were no active cases of diphtheria in either family.

In my conversation with Dr. Robinson he stated that the fowls that were given

*From the Department of Bacteriology of Vanderbilt School of Medicine.

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antitoxin were all advanced in the disease and three of them were unable to walk. A few hours after the administration of the antitoxin, marked improvement was noted and rapid recovery resulted. Those that were treated with antitoxin recovered in a few days, while in those not so treated a 50 per cent mortality resulted and the surviving 50 per cent ran a course of from two to eight weeks. The Fox girl, aged 13, and the Potter boy, aged 16, proved to be persistent carriers. The Klebs-Loeffler bacilli isolated from these two cases proved to be virulent to guinea pigs.

The disease called "roup" by poultrymen is a contagious catarrh, closely resembling the more malignant forms of influenza in the larger animals and in man. It attacks principally the membrane lining the eye, the sacs below the eye, the nostrils, the larynx and the trachea. It is attended with high fever and is very contagious. The nature of the micro-organism which constitutes the virus is not known. The saliva and the discharge which escapes from the nostrils carry the contagion and soon contaminate the drinking water and feeding troughs, so that all susceptible fowls are infected. Even the flocks in adjoining yards are infected by the particles of mucus projected into the air when sneezing or shaking their heads in their efforts to free the air passages from the thick mucus. The disease is distinguished from fowl diphtheria by the absence of a thick, tough and very adherent newly-formed membrane (false membrane) in the nostrils, mouth, and throat of the latter. Fowl diphtheria is caused by a filterable and invisible virus and, therefore, is entirely distinct from the diphtheria of man which is caused by the well known Klebs-Loeffler bacillus.

It is not entirely clear whether the chickens under question were suffering with roup or fowl diphtheria since they had pseudo-membranes in their mouths and throats.

BACTERIOLOGICAL DATA

Ten swabs were sent to me by special delivery mail by Dr. W. T. Robinson, of Murfreesboro, Tenn., having been obtained from the throats and nasal secretions of ten fowls affected with roup or fowl diphtheria. The swabs were those ordinarily used for diphtheria work consisting of a pledget of cotton wound around a wire at the end and inserted in a test tube plugged with cotton. They were previously sterilized in a hot air sterilizer for two hours at 170° C. Each swab was inoculated with three Loeffler blood serum slants and incubated for twenty-four hours. Several characteristic colonies were isolated from each tube, transferred to Loeffler's blood serum and grown for twenty-four hours at incubator temperature. Those colonies responding tinctorially and culturally to the Klebs-Loeffler bacillus were inoculated into broth cultures to be tested for their virulence to guinea pigs, which will be given later in the paper.

Morphology. — Incubator temperature for twenty-four hours on Loeffler's blood serum showed organisms for the most part long and slender, revealing polar granules, prevailing terminal in location, and with a marked tendency to typical group arrangement in angles and parallels. The types encountered would be classified C and D on the Westbrook scale, with the long, slender form, C, predominating. They were Gram-positive; and Neisser-positive and not acid-fast predominated in smears from the younger colonies.

Cultural Characteristics. — Colonies were grayish-white, moist, confluent and non-adhesive after growing on Loeffler's serum medium at incubator temperature for twenty-four hours. After several days' incubation they became yellowish. There was no proteolytic action in the cultures six weeks old. On plain agar the growth was definite, but feebler and scantier, and the individual colonies were tiny. In litmus milk a trace of acid without coagulation developed. In glucose infusion broth cultures, a granular deposit was formed without clouding. Pellicle formation occurred. The tests for the action on sugars were performed with sugar-free broth, to which the sugar was added prior to the final sterilization. Acid without gas was formed in glucose, maltose, and dextrin; alkali, in manite and inulin; while no

change in reaction occurred in lactose, xylose, and arabinose broth cultures.

The staining, morphology and cultural characteristics of the bacilli isolated from the Fox girl and Potter boy were practically identical with those isolated from the fowls.

Virulence Tests.—For the determination of virulence, guinea pigs weighing 300 grams each were inoculated subcutaneously with 1 c. c. of a forty-eight-hour broth culture. A positive result was recorded when the animal died within four days after injection and showed characteristic injection edema at the sight of inoculation with hyperemia of the adrenals. The controlled animals received the same dose, were immunized with 500 units of antitoxin and remained well.

Of the ten cultures from fowls, two killed pigs in two days. Five cultures killed in three days and three killed in four days with characteristic lesions. Cultures from the Fox girl killed in four days, while the Potter boy cultures killed in five days with characteristic lesions using control immunized pigs.

Experiments Upon Healthy Fowls.—Three healthy fowls were used. Preliminary cultures were made in order to show that they were free from diphtheria bacilli at the beginning of the experiment. The inoculations were made by introducing into the posterior nares and throat a swab which had been soaked in a thick opaque suspension of diphtheria bacilli that were isolated from fowls. Each fowl was kept in a separate cage. Nasal and throat cultures were taken at two-day intervals. At the end of six days one of the fowls proved negative to the diphtheria bacillus, while in three weeks the other two fowls showed negative to the Klebs-Loeffler bacillus. In these experiments it was noted that the number of diphtheria bacilli diminished in number every two days in which cultures were taken.

No membranes were noted or clinical evidences of diphtheria observed in any of the fowls.

Experiments on Fowls with Roup.—Two fowls were selected with severe cases of roup and subjected to the identical technic employed with the healthy fowls. Cultures were made every day for Klebs-Loeffler bacilli. One of the fowls died on the seventh day, the other on the ninth day. Cultures showed that the Klebs-Loeffler bacilli had diminished on each successive day, but persisted at the death of the fowls. No membrane or clinical evidence of diphtheria presented itself. It is believed that the Klebs-Loeffler bacilli contributed in no part toward their death.

In healthy fowls the carrier state was difficult to produce and was generally quite transient. It is a question whether the diphtheria bacilli had actually multiplied or merely persisted in the nasal passages. Although negative "carrier" results were obtained with two fowls with the roup, this is not enough from which to form a general conclusion. It is evident that a greater amount of experimentation would be necessary to clarify this question.

CONCLUSIONS

(1) This is the first instance, as far as I have been able to find in literature, in which virulent Klebs-Loeffler bacilli have been isolated from fowls.

(2) It is probable that the fowls received their infection from human beings harboring virulent bacilli, since persistent virulent carriers were demonstrated in the families that owned the fowls.

(3) Experiments upon healthy fowls failed to produce a permanent carrier state. Certainly nothing corresponding to carriers as seen in man was observed. Negative results were also obtained in two fowls suffering with roup.

(4) The demonstration of virulent Klebs-Loeffler bacilli in fowls opens up a new field for the means of dissemination of the Klebs-Loeffler bacilli among human beings.

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DISCUSSION

Dr. W. S. Leathers, University, Miss.—One phase of this subject deserves consideration from the standpoint of public health. It seems to me, based upon the findings of the investigation made by Dr. Litterer, that there is a possibility of sporadic outbreaks of diphtheria occurring among children handling fowls which have viru-

lent diphtheria bacilli in their throats, either during the disease known as roup or following this condition. From an epidemiological standpoint, I do not think that it is likely that a carrier condition among fowls, the result of exposure to human beings who have virulent diphtheria bacilli in their throats, would be a very potent factor in the transmission of diphtheria. However, I think that it is one meriting consideration, and in the event of an outbreak of diphtheria, it is well to keep in mind the results of the investigation made by Dr. Litterer, which are of decided value.

Diphtheria is not a very contagious disease. It is not transmitted so easily as many other infectious diseases, but the transmission of bacilli from one individual to another is the common mode of the spread.

The paper as presented by Dr. Litterer deserves thoughtful consideration from the viewpoint of sporadic outbreaks of diphtheria, but we should not consider the question of diphtheria bacilli in the throats of fowls as a decided factor in the transmission of the disease.

Dr. C. C. Bass, New Orleans, La.—The subject discussed by Dr. Litterer deserves a great deal of consideration. The diphtheria bacilli that have been recovered from fowl diphtheria in the past have not seemed to be identical with the one that produces diphtheria in man. If Dr. Litterer is right that the organism is capable of producing the disease in man, and that they are perhaps identical organisms, then it is quite possible that this is another source of endemic or latent diphtheria. It is another possible source of outbreak.

It would not be, as Dr. Leathers has indicated in his discussion, the probable source of much of the diphtheria that we have, for the number of cases that could come from this source would be extremely small. However, if it is the source of an occasional case, that case might be the cause of an outbreak consisting of a very much larger number of cases.

My own feeling is that it is desirable that this idea should be confirmed by transmission of the disease from fowl to fowl and, if possible, by identification in some other way, of the organism found in the fowl with that found in man. We must remember that there are a good many diphtheria-like bacilli known and recognized, more than one of which is pathogenic for animals, and it would really be rather difficult to determine whether the organism found in fowls can actually be transmitted to man without an experiment which would hardly be justified. Even the successful inoculation of fowls with the organism from human diphtheria does not prove the thing. We have to do it the other way around.

Dr. William Krauss, Memphis, Tenn.—Dr. Litterer's findings appear to me to be very convincing. He made a culture of the organism which he recovered and inoculated it into guinea pigs protected by ordinary diphtheria antitoxin, and those guinea pigs were proof against this particular organism. We are, in the absence of contrary evidence, driven to the conclusion that what Dr. Litterer was dealing with is what we know as the Klebs-Loeffler bacillus. On the other hand, if this is the only report of this condition, we shall have to make more investigations as to how often this thing can happen, because bacteriologists are definitely committed to the view that roup is a mixed infection, and that a diphtheria-like organism is a secondary invader, so the idea that there might be something like the diphtheria bacillus in roup is not new. Certainly the discovery of the typical Klebs-Loeffler bacillus must be looked upon as something quite unique, and it would require a considerable amount of confirmation from a large number of sources that it is a usual occurrence. I am inclined to doubt it.

Dr. James A. Hayne, Columbia, S. C.—There is an impression among the laity that black tongue among dogs can be cured by diphtheria antitoxin, and I have found, in the distribution of diphtheria antitoxin in my State, that quite a number of dogs are named as human beings and treated with diphtheria antitoxin. Now, if roup is to be treated with diphtheria antitoxin, the number of chickens in my State being large, I can foresee quite a large demand for antitoxin.

It seems to me that Dr. Litterer has made a very unique contribution to epidemiology, if he is correct in his findings and if his findings are confirmed. I know that South Carolina is largely an agricultural state, and the people are rather isolated. Yet at times we have found diphtheria where it seemed to be impossible to trace it to any source outside the farm or farmhouse where the child lived. It is possible that chickens were brought to those isolated farms and carried with them the disease.

Dr. Litterer (closing).—Roup is confused by some with fowl diphtheria. Both are entirely different from human diphtheria. In fowl diphtheria there is the characteristic membrane of the nose, throat and trachea. It is caused by a filterable virus. Roup is also caused by a filterable virus, somewhat similar to fowl diphtheria, except that no membrane is encountered. Whether these chickens were suffering from roup or fowl diphtheria or a combination of both, I am unable to say. They undoubtedly had human diphtheria of the real virulent Klebs-Loeffler type, engrafted upon some other condition. It is quite evident that no pseudo-diphtheria bacillus can produce a toxin. These chickens were suffering with a toxemia which was caused by the elaboration of the diphtheria toxin by the Klebs-Loeffler bacilli that were found in their noses and throats. Proof of this is shown by the administration of antitoxin by Dr. Robinson with the phenomenal results to those that were given the serum. Those not receiving the antitoxin either promptly died or had a protracted illness lasting several months. Another convicing proof concerning the etiology was the fact that the diphtheria bacilli found were virulent to guinea pigs. The pseudo-diphtheria bacillus can abso-

lutely be excluded on this ground alone. The diphtheria bacili were isolated from all the fowls repeatedly. They were the typical Klebs-Loeffler bacilli responding to all the tinctorial and cultural characteristics and belong to the types C and D of the Westbrook scale.

Since writing this paper I have made a number of investigations of roup among chickens, but have never found the diphtheria bacillus either in roup or in chicken diphtheria. So it is evidently a pretty rare condition.

One member of each family who owned the fowls was a persistent, virulent diphtheria carrier. The Klebs-Loeffler bacilli were identical in type so far as I could tell with the type of diphtheria found in the chickens.

Further investigation should be made with a view of ascertaining just how prevalent the condition is.

SCHOOL INSPECTION BASIC IN THE CONTROL OF COMMUNICABLE DISEASES*

By John Thames, M.D.,
City Health Officer,
Little Rock, Ark.

One of the most striking facts in the work of the public health program of today is the rapidly growing interest in school inspection. Boards of education are advancing the idea more rapidly than boards of health are able to provide equipment to operate the plan successfully. There also appears to be some difference of opinion as to what department school inspection should come under, whether it should be performed by the board of education or the board of health.

There are two parts to the question of school health supervision: one is the teaching of health, the other is medical inspection. One is so dependable on the other that we should unite them and use the general term "school hygiene." School hygiene is undoubtedly the most important study in the school curriculum. When properly taught, it requires the knowledge of a technically and professionally trained mind. It also requires the combined efforts of the board of education and board of health operating harmoniously together to accomplish the results for which it is intended.

School inspection was first instituted for the purpose of controlling an epidemic of diphtheria. In 1894, Dr. Dergan, Health Commissioner of Boston, Mass., at that time, conceived the idea that if he put doctors in the schools he might be able to stamp out the contagion at its source. The result of his experiment was sufficient to warrant the keeping of doctors in the schools to inspect the children in order to determine whether or not they were infected with any contagious disease. In 1896, Philadelphia instituted a system of school inspection as a means of contagious disease control. New York City did the same in 1897. The idea of school inspection has gradually increased until at present it would be difficult to find a city of any size that has not some system of school inspection. Without a single exception, the system of inspection was instituted and doctors placed in the schools to inspect children for the purpose of determining whether or not they were infected with contagion that might be communicated to other children.

School inspection is therefore accepted as a health measure, and as such should be directed by the local health officer. While it is necessary to have the support and cooperation of the board of education to accomplish the desired results, we should not lose sight of the fact that the main object of school inspection is to control contagion, either by discovering and excluding the children acutely infected, or instructing them in a knowledge of hygiene and sanitation that will better enable them to resist the invasion of disease. The ultimate responsibility rests upon the health official, therefore it is only right and proper that he should direct and control the policies of school health supervision.

It is a noteworthy fact, one that any municipality may well consider, that the large cities that first instituted a system of school inspection for the purpose of controlling contagious disease, under the board of health, have continued to operate under that system. Their records show a gradual reduction in cases and deaths from communicable diseases; and in every

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instance the results are in direct proportion to the extent of school inspection or school medical supervision done.

In the great city of New York during the influenza epidemic of 1918, Health Commissioner Copeland recommended not closing the schools, for it was his opinion that the system of school inspection would be more efficacious in the control of influenza than the closing of the schools would be. The schools did not close, and comparison of the record of New York with other cities that closed their schools on account of influenza shows that Dr. Copeland was correct in his idea of how best to control influenza.

In New York, Philadelphia, Detroit, Cleveland and other cities, the results have been sufficient to warrant the employing of an adequate number of doctors and nurses for school inspection, and in every city where the work is carried on in a systematic, efficient manner communicable diseases are being rapidly reduced to the minimum.

Where there is not an efficient system of school medical inspection; where the teacher does not look over her children the first thing in the morning and observe any signs of illness and refer any who are found with suspicious symptoms to the school doctor or nurse; where the school doctor or nurse does not carefully look over cases sent to him or her; where the nurse or doctor does not make regular routine inspection of all classes at frequent intervals to find evidence of contagion; where cases are not followed up and a correct diagnosis made, any school is likely to become a hot bed of infection. Conditions of this kind furnish a very good reason for parents of school children to blame the school for their child's sickness. In schools where the opposite conditions prevail, where there is efficient medical inspection, and where the board of education and board of health work harmoniously together, all these conditions are thoroughly looked into by trained inspectors. Cases are followed up in their homes, where the parent case is frequently found. Sometimes there is a carrier condition among one of the adult members of the family or in a child of pre-school age. At other times, the source is found in the family of a friend or neighbor, perhaps in another section of the city. The search for and finding of the source of contagion is an important factor in the control of disease. The vicious ring of a communicable disease is composed of three sections: the source, the mode or means of communication, and the victim. In order to control the contagion, the ring must be broken at one or more points. To discover and isolate the victim is not enough. A more thorough knowledge of the causes of infectious diseases has shown very clearly that the exclusion of infected children from school is not sufficient. Locating the source of contagion and cutting off the line of communication is essentially necessary for a complete control.

Professor Rosenau says we have at last discovered that the whole child attends school, the physical body as well as the mental, and the two are very closely allied. Where the body is found defective, there is almost always a corresponding mental deficiency. The greatest number of physical defects can be corrected through the teaching of health. Visualize health to the children and they will insist on having their defects corrected. The more a child is enlightened on the subject of hygiene and sanitation and what it means to be in possession of a reserve force of strength and energy, the more that knowledge will be transmitted by the child and disseminated in the home. School children are as capable of becoming carriers of health as they are of disease. Health is contagious when children become imbued with the health idea and the simple rules for conserving it.

The teaching of health is an important part of school hygiene and is an essential factor in the program of school medical supervision. Children are taught prevention by instructing them to conserve health and how to build up their bodies to resist disease, or at least to reduce their susceptibility to contagion.

The use of the Schick test to determine the susceptibles to diphtheria, and the successful use of toxin-antitoxin to immunize children against diphtheria is commonly conducted through a system of school inspection. This method of diph-

theria prevention has extended to the children of pre-school age. Drs. Park and Zingher, of New York, recommend that every child should be immunized before the age of entering school.

The requirement for successful vaccination of all school children and teachers has been the means of eliminating smallpox where the requirement is persistently enforced.

The instituting of instruction in oral hygiene in schools came as the result of medical inspection. At least 40 per cent of school children have defective teeth and 90 per cent have neglected mouths. It has been found that defective teeth and unclean mouths play a large part in reducing the vitality of children and causing them to be more susceptible to disease. A correction of these defects will materially aid in the control of disease invasion.

It seems useless to attempt to enumerate in detail what has been accomplished as result of school inspection, yet I do not believe it is being sufficiently recognized by the proper authorities. From my own experience and what I have been able to gather from other health officers throughout the country, I am convinced that school inspection is basic in the control of communicable diseases.

In Little Rock we have a splendid system of school inspection. The City Health Officer is Medical Advisor to the Board of Education, and there is absolute harmony between the Board of Education and the Board of Health. Regular courses of instruction are given in the schools, on nutrition, posture and systematic exercises, the most essential subjects for conserving health. While we have an insufficient number of full-time paid inspectors, there are always doctors and dentists ready to serve when called upon to assist in special work, and they give their time and knowledge unstintingly. This arrangement enables the Health Department to carry out the program to a large extent, and what has been done has been a wonderful assistance in controlling the spread of disease in Little Rock. We depend very largely upon school inspection for the discovery of the mild and overlooked cases of contagion and carriers. It is universally accepted that the first duty of a health officer in his effort to control communicable diseases is to discover the cases. I have found it much easier to control diphtheria and scarlet fever during the time school is in session. There is always an increase in cases immediately following both summer and Christmas vacations that we have been able to discover and control through our system of school inspection.

The only means we have to control the minor contagious diseases such as scabies, chicken pox and mumps is by school inspection, and I am of the opinion that when we have any success in the control of measles and whooping cough, it will come as the result of school inspection and the teaching of health in the schools.

I hope that this paper may be of assistance in stimulating doctors and health officials to consider the importance of school medical inspection.

DISCUSSION

Dr. J. A. Hayne, Columbia, S. C.—I wish to call your attention to a scheme which was carried out in South Carolina, not under the auspices of the State Board of Health. In fact, the Board of Health felt about it as we do a case of dynamite. There is a little town named Garnett which has a population of about 300, but with quite a number of people in the surrounding county. They built a high school which had a rather large number of children in it and decided this year that they would organize an association for the purpose of keeping their children well. They called it the "Keep Well Club," and every parent who had a child in the school could belong to the Club. The children were thoroughly inspected, they were weighed and examined in every way, and the parents paid $5.00 a year for each child. They selected a physician and they paid $5.00 to the physician to look after the health of the children. It was his duty to keep the children well. We have now in pamphlet form a full history of this experiment. It shows what the public is going to do about keeping their children well. This was not organized by doctors, by a state board of health, or by health officers. It was organized by the people who wanted their children to go to school and to keep well.

The appointed employee is a graduate physician and member of the South Carolina Medical Association, but fortunately for the experiment he was the only doctor in this town. He agreed for $5.00 a child to keep these children well, which gave him $1500 during the school term. The records show that there was less sickness

among the school children that year than was ever known and that every child gained in weight.

Dr. A. H. Hayden, Columbia, S. C.—The most vital need to supply deficiencies in public health work is to procure the daily cooperation of our educators in the public and private schools. Educators, from the highest educational institutions to the kindergartens of our states, are the very ignorant in regard to the health laws of their state, or they do not obey them, at least in the small towns and rural districts. The responsibility for thorough knowledge and obedience to health laws governing schools by pupils and teachers alike, begins with the state superintendent of education, goes on next to the county superintendent, next to the board of trustees, next to the principal, and last to the teachers of our schools. Some officer should be made responsible, to see that these laws are known and carried out to the letter.

We can accomplish little in the training of human beings unless we begin the training at the beginning of life. To my mind the most important thing to do is to devise means by which parents and teachers alike can be brought to a realization of the fact that the teaching of hygiene and sanitation must begin at the cradle and be taught daily and insistently from infancy throughout the early years of home and school life. If we have a systematic method of bringing these matters to the attention of home people, especially to mothers' clubs, for distribution to their community families, from the mothers we may make the demand universal that at least kindergartens and the primary grades shall devote most or all of their time to the thorough grounding of sanitary and hygienic laws into the minds of our children. As the twig is bent so the tree grows. Earliest impressions are lasting, and early training is the most important of all training. More, much more, time should be devoted to the teaching of sanitation and hygiene in the infant classes in our schools than is now given.

Dr. C. C. Applewhite, Jackson, Miss.—Dr. Thames stated that the local physicians lined up with him in everything he undertook. I wonder if he has undertaken along with his communicable disease control work any corrective work, and if so, what method he utilized in getting the corrections made. This work of correcting physical defects among school children has caused, in my experience, considerable disturbance. A plan whereby this work can be done to the satisfaction of the local physician would be very acceptable. I would like to take issue with one of the men relative to the school teachers. It has been my experience that school teachers, as a rule, are keenly interested in and have a fairly good knowledge of preventive medicine and can be reliably counted on to assist in carrying out any reasonable public health program.

Dr. Thames (closing).—Replying to Dr. Hayne, I do not find the physicians of Arkansas very different from those of South Carolina. My idea is that the manner in which you approach doctors determines whether or not they will cooperate with you in public health work. I have had no trouble in Little Rock in getting a sufficient number of physicians to make the special examinations of school children, nor have I experienced any difficulty in having all defects corrected where we were able to get the children to the public clinic connected with the City General Hospital. The majority of the clinic staff are either teachers or adjuncts in the Medical School of the University of Arkansas, and they have the opportunity of using all clinical material for demonstrating purposes.

I am sorry that I have no statistical report to show the percentages of improvements during the time that I have been in Little Rock; but hope that some time in the future I may have the pleasure of presenting another paper along this same line, when I shall give exact figures of what has been accomplished in correcting the various defects found among school children.

SURGERY

RAILWAY, INDUSTRIAL, GYNECOLOGICAL, OBSTETRICAL AND UROLOGICAL

RESTORATION OF THE BURNT CHILD*†

By V. P. Blair, A.M., M.D., F.A.C.S., St. Louis, Mo.

In the following I shall deal with reconstruction problems, not with the immediate treatment of burns. I shall use certain cases to illustrate my points, chiefly in the intermediate stages.

Burns of the hand are functionally most crippling, but burns of the face may be more appalling. Anything that attracts attention to the child in an unpleasant way, its own attention, the critical attention of other children, or ill-advised sympathy of adults, may produce an unfortunate reaction on the child's morale.

For all these reasons reconstruction of the child should be begun as soon as it is surgically practicable, and it is not always necessary for the wounds to epitheliate spontaneously before skin grafting or flap operations are begun.

Almost all of the cases that come to reconstruction have suffered burns that destroyed the full thickness of the skin, but rarely deeper than the superficial fascia. Reconstruction is seldom sought for the milder cases, and deeper burns are more frequently fatal.

It is on the ear and nose chiefly that the destruction is likely to go deeper. Except from the burns of powder and of corrosive fluids, the eyes themselves are seldom damaged.

The deformities we are called upon to correct consist primarily of the loss of skin which has been replaced by a retracting scar. If the contraction has persisted during the growing period, it is likely to be complicated by under-development of the parts affected, such as small fingers or short tendons, or by peri-articular fixations or joint and bone distortions.

Abnormalities of the scar itself that we have been called upon to treat have been keloid scar, early induration, late induration that may become cancer or the persistence of an active pus infection in the scar.

The first, the most important and absolutely controlling step in any of these restorative operations, is to cut or remove the scar sufficiently to allow the remaining skin and tissue to return to their normal positions. Unless this is done thoroughly, often to over-correction, the operation cannot be completely successful. In old standing cases osteoplastic resections, joint stretching or tendon lengthening may be necessary adjuncts to simple scar excision.

After the scar is excised and the neighboring parts are replaced, then the resulting raw surface is to be covered with epithelium. This may be done by means of a Thiersch graft, a full thickness skin graft, or a sliding or pedicle flap. The choice will depend upon several factors: the Thiersch graft is the most easily applied, gives poorest cosmetic results and in healing contracts more than the full thickness graft or flap. A successful full thickness skin graft will contract about one-fifth or one-half its area. It is an excellent substitute for the destroyed skin except that it will usually tan to a greater or less degree. In a clean field where skin alone is desired and some tanning is not objectionable the full thickness skin graft is the material of choice. Where a subcutaneous fat pad as well as skin is required a flap graft is selected. Where applicable to the hand the full thickness skin graft has its advantage over abdominal flaps: the hand can be splinted in any desired position of over-correction while the skin graft is uniting. It is sometimes desirable to combine these two meth-

*From the Surgical Department of the Washington University Medical School, St. Louis, Mo.

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ods. The flap graft is thicker than the full thickness skin graft, carries some subcutaneous tissue and does not tan abnormally. It may be placed in a field that is not absolutely clean. These special qualities influence the selection of the material to be used in the particular case.

Fig. a Fig. b

Figs. a and b. Case showing an ear characteristically crumpled as a result of a burn. The deformity is due to loss of skin on the anterior surface and to partial loss of cartilage at the border, greatest at the helix. The helix was pieced out as was also the anterior surface of the ear, between the antihelix and the posterior border, by pedicle flaps raised from the hairless skin behind and above the attachment of the ear. b. does not show the finished stage. Part of the redundant helix flap will be removed at a future operation.

The grafts or flaps are cut according to tin foil patterns made either from the raw surface directly or from a previously made reconstruction on a plaster cast and are either sutured in place or supported on forms or both. The Thiersch graft is best supported on a wax form or on sections of fine marine sponges.

Thiersch grafts are usually best obtained from the thigh, but if cut too thick will subsequently grow hair. For full thickness grafts the available skin that most closely resembles that to be replaced is used, while flaps are obtained from some neighboring site or are transferred as "jump" flaps on the hand or forearm. It should be kept in mind that the nearer the source of the graft is to the defect to be filled, the more closely will it resemble the skin for which it substitutes. When very thin or long flaps are used, delayed transplantation will insure their vitality. It is in growing children that the full thickness skin graft takes most kindly and gives best average results. On these children more and more are we using full thickness skin grafts where formerly we used flap grafts. It would be a great help if we could get the skin from the mother in some of these cases, but our experience is that while at first the homo-graft "takes" beautifully, after two weeks it begins to necrose and is slowly lost. This even when the blood "matches." Before finally giving up this plan, I am going to try the suggestion of Dr. Montrose Bur-

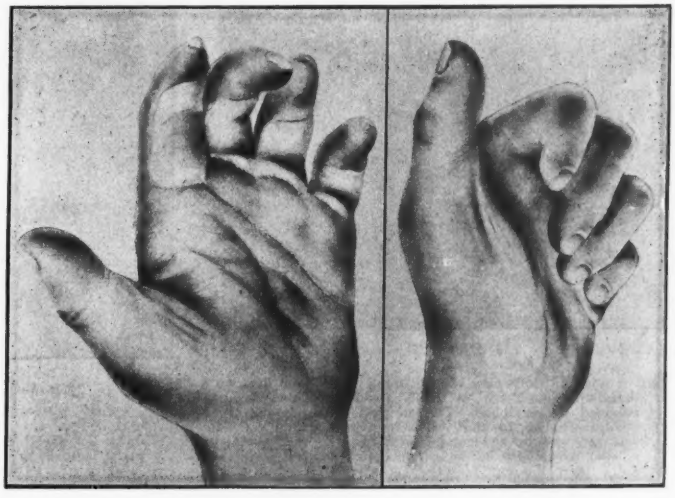


Fig. d Fig. c

Figs. c and d. c shows a nine-year-old child's hand from which most of the palmar skin was burned at the age of three years. At a previous operation the fingers were straightened out and a pedicle flap was transplanted from the abdomen to the raw surface on the palm, but the fingers have again contracted almost to the original condition. In this condition the fingers are not usable. d shows the result of a second operation by which the fingers were again freed and extended and full thickness skin grafts were applied to the raw surfaces. The fingers and hand were held extended on a splint during the healing period. In the picture the skin grafts show lighter in color than the abdominal flap. Though the fingers cannot now be fully extended, they are, in their present condition, usable and mobility will increase with use.

Fig. e Fig. f

Figs. e and f. Eversion of the upper lid with complete fixation of the lid to the brow resulting from a burn received in early infancy. The correction was made by a Thiersch graft applied over a wax form—"Gillies' outlay graft." f shows ability to close the eyelids. This picture was taken two years after the operation just described.

rows and take the skin from a donor of about the same age as the recipient.

In treating an ectropion of the mucosa of the lids or lips, the stent or outlay graft, "Gillies" modification of the Esser graft, is ordinarily most effective. Ectropion of the nostrils is easiest corrected by making a transverse incision across the dorsum of the nose, sliding down the tissues and filling the defect with a full thickness graft.

Fig. g Fig. h

Figs. g and h. Ectropion of the upper and lower lips with inability completely to close, resulting from a burn received in childhood. The correction was made by a technic similar to that used for Case e and f. This was followed by a second operation for the adjustment of the vermilion border. The point of the chin has since been brought forward by a cartilage insert.

The eyebrows may be well imitated by a full thickness graft taken from the scalp behind the ear. If the graft takes perfectly, the hair will grow naturally. If there is a slight surpeficial loss of the graft, the hair will be fuzzy and if the full thickness of the epithelial layer of the graft dies, the hair will fail to grow.

Burnt ears must be unfolded and the defect covered with flaps or full thickness grafts.

In using full thickness grafts on the palm of the hand or finger it is well to make the raw surface and the graft larger than the original defect by undermining the bordering skin and turning it outward in flap form. This allows for contraction.

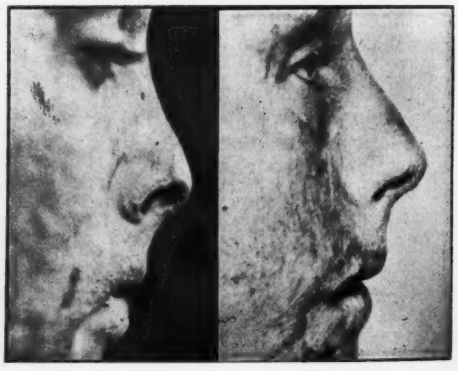


Fig. i Fig. j

Figs. i and j. Eversion of the nostril and snubbing of the end of the nose due to destruction of the skin by a burn in early childhood. A transverse incision was made across the bridge from cheek to cheek at the level of the upper border of the alae. The skin with the subcutaneous tissue was undermined and pushed downward and the resulting defect was filled with a full thickness skin graft. The scarring on the cheek is rather accentuated in the second photograph. In a girl we might attempt to correct this by skin grafting.

The arm bound to the side, following an axillary burn, is released by incising the scar bands and the defect is filled by a full thickness skin graft or by pedicle flaps as best suits the particular case.

Any large area covered by full thickness skin grafts may require repeated grafting to compensate for partial loss of, or shrinkage, of the grafts.

Top: Fig. k. Bottom: Fig. l

Figs. k and l. k shows the absence of the outer two-thirds of each eyebrow due to burn at nine years of age. l shows replacement by a hair-bearing skin graft taken from behind the ear. The scar at the junction of the graft with the natural brow shows on each side. This could be avoided only by restoring the whole brow in one piece, but it is made inconspicuous by training the hair over the bare area. Following a successful scalp graft, the hair must be trimmed at stated intervals, but otherwise it is an excellent imitation of the natural brow.

Changes in the scar, other than contraction, may call for its removal. Among these changes are indurations that might precede or have actually become cancerous and chronic infections. A simple thickening of the scar may be treated by "tincture of time," by shaving off the ridges and edges and Thiersch grafting, by the use of radium, by excision followed by a full thickness graft or by a sliding or a pedicle flap operation.

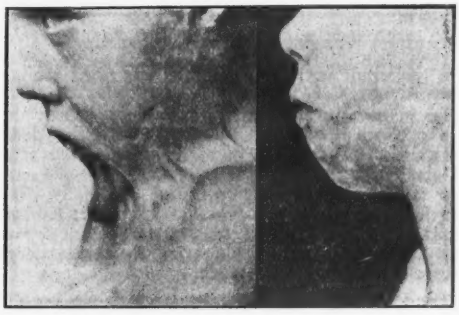
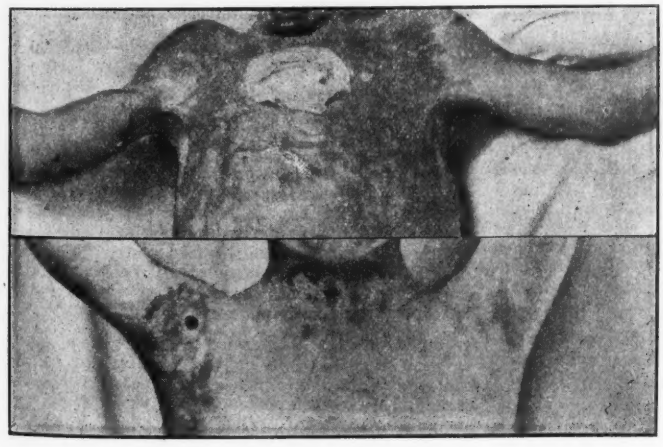


Fig. r Fig. s

Figs. r and s. r shows a union of the lower face tissues to the chest wall following a loss of the skin from the lower part of the face, front and sides of the neck and the upper half of the chest. In this instance the lower lip was attached to the front of the chest an inch below the upper border of the sternum. If this condition had been permitted to continue the lower jaw would have become distorted and the teeth everted. The correction shown in s was made by freeing the lip, chin and submaxillary tissues from the neck and chest by a transverse incision from ear to ear and covering the raw surface with full thickness skin grafts. On account of the subsequent contraction of the underlying scar the grafting was repeated several times, putting in a strip of skin 3 centimeters wide at each later operation.



Top: Fig. m. Bottom: Fig. o

Figs. m and o. o shows fixation of the arms by axillary scars. Released by cutting the scars, abducting the arms and covering each raw surface with a full thickness skin graft. One side was done at a time and the abducted position was maintained for about two weeks.

By patience, persistence and good surgery these unfortunates can be greatly improved in comfort, appearance and function and as a general rule the earlier the restoration is undertaken the better will be the result; although I have operated upon such cases fifty or sixty years after they were burned.

DISCUSSION

Dr. J. Shelton Horsley, Richmond, Va.—Dr. Blair's work is so excellent that it is difficult even at the expense of boring him not to

begin the discussion of his presentation with an expression of sincere admiration. Those of us who have been sufficiently fortunate to see him work in his own place and know the infinite pains he takes can readily understand why he gets such good results.

I am delighted to hear emphasized the points concerning isografts and autografts. There has been much spectacular surgery that had no basis in biological principles in which a child's face was covered with skin from the pig's belly. Newspapers have become cognizant of it and have made a wonderful thing of it. They do not follow up to see if it sloughs off later and does not take. As Dr. Blair says, at times autografts will not take under the best conditions. We can get results in various ways, and one is by preventing contraction by traction. A little rubber band placed in the line of supposed contraction and kept constantly in place will work wonders. I think the dentists have taught us much in regard to this little rubber band which will bring the alveolar structure in position when seemingly nothing but a mallet and steel band would have any effect.

Where does the contraction after scars come from? In the bile duct bridges of connective tissue have been grafted in, supposing that if they are covered over with epithelium there would be no trouble. Strictures of the urethra are covered over with epithelial tissue. The contraction forms from the inner, lower, substratum, the dermis or corium, and when that has once occurred it is impossible to do away with it unless we cut it away. This contraction can be made less obvious by the various ingenious methods that are used, but it tends to recur just the same. The importance of this fact is great. In the thin tissues above the eye, where the corium is very thin, you can successfully utilize a Thiersch graft, but usually you have to transplant whole skin, preferably from some region of the face.

Another thing is that we must remember that contraction depends upon scar tissue and that depends upon many things, among others infection and lack of nutrition. If the nutrition is cut down, the highly differentiated cells cannot live and you find excessive scar tissue. Dr. Gessner, of New Orleans, has done some excellent work in that way on the testicle. He found that if the blood supply is too much diminished in a testicle, the testicle may not slough, but the parenchyma cannot live and the testicle becomes a mass of scar tissue. And poor nutrition invites infection.

Dr. Frank K. Boland, Atlanta, Ga.—Dr. Blair stated recently that when one of his patients became sick he sent for a doctor. His work is not with sick people, but entirely with plastic surgery.

Something should be said about prophylaxis against the bad deformities. If the cases were handled differently sometimes in their initial treatment the deformity might not be so bad and might not require such extensive operations later. The first thought in these cases always is to preserve life. The children come in a condition of shock. If they could be handled to prevent deformities by proper splinting and separation of fingers and toes, oftentimes the deformity would not be so marked. They are usually handled at first by general practitioners, but it would be well if the plastic surgeon could have something to say about the first handling. I think the necessity for such extensive plastic surgery might not be so great under those conditions.

Dr. Joseph E. Johnson, Memphis, Tenn.—Dr. Blair spoke of putting on the Thiersch graft in the earlier stages of burns of the face, which is an excellent idea for several reasons. The granulation tissue is what eventually makes our scar tissue, but, as we know, in any wound cicatrization does not begin until the twelfth day. Granulation tissue occurring in the presence of infection is what makes these scars that later destroy the face. It is remarkable that if you stretch the face gradually as the dentist does you can stretch it to almost any extent. Where the deeper structures are involved and have been allowed to cicatrize, contraction follows. By putting on the Thiersch graft first, this graft will not contract as does the scar tissue and you will not have the formation of such a large scar. The Thiersch grafts have practically no place in the face, for they are inelastic. We must have a flap graft or a whole skin graft.

In the mouth if the deeper structures are not involved and we cut the tissues loose, the muscles go back into expression and pull these into place. If there is no destruction of the seventh nerve you can stretch back almost any face into shape.

In the handling of the scar the ambrozene treatment seems to clean them up more rapidly than anything else. We have another method of getting skin instead of taking it from the abdomen or the prepuce where we want thin skin for use around the eyes. Skin from the prepuce will tan very easily. I recently used this around the eye, but had to remove it because of the marked tanning.

The Thiersch graft on the hands has not been satisfactory. I recently had a case of a rope burn of the hand. I made a flap on the back, like glove fingers, put a drain in under the hand, and left this on for twelve days, to the time cicatrization began. I then cut through the end of this and left it until it adhered on the sides. I think better results resulted than if the flap had been left and divided later. This man could move his fingers at the end of twelve days and put his hand in his pocket.

Dr. Hermann B. Gessner, New Orleans, La.—I wish Dr. Blair, in closing, would give us the details of how his whole thickness grafts are made. My own experience with these grafts has been unsuccessful. The only whole thickness grafts I have used with satisfaction have been of the type described by Dr. J. S. Davis in his book on plastic surgery, perforated with the scalpel in a number of slits.

Dr. Blair (closing).—A Thiersch graft will contract very greatly, but it has a distinct place in the repair of the face if you allow for this contraction. On the eyelid and on the lip the subcutaneous muscles are normally closely attached to the skin, a condition more easily reproduced with the Thiersch graft than in any other way. For ectropion of the lip or lid the raw surface is made three times the ultimate size desired, and the Thiersch graft is draped over a wax form of corresponding size. The graft covered form is held against the raw surface by the tissues being sutured snugly around it. By undermining the skin the raw surface can be made any size desired and thus the contraction may be allowed for. We have not been able to control or foretell the ultimate color of these grafts. They may be too white or they may be tanned.

Dr. Johnson brought out one of the most important things about the face. If you will release the muscles of expression they will go to their proper place. This accounts for the postoperative improvement usually seen in operations for facial defects and deformities.

The whole thickness skin graft is like the little girl who had a little curl—"when she was good she was very, very good, and when she was bad she was horrid." It is surgically possible to transplant whole thickness skin grafts and get nearly perfect results in the majority of cases, but we have failed in all possible conditions. If you cut the graft exactly the size of the space it is to go into, within twenty-four hours it will have an active blood supply. If you cut into it with a knife it will bleed arterial blood freely. It is easy to get the supply, but unless you limit it or provide drainage, by the end of a week much or most of the graft may have choked to death from engorgement. At first we tried to get rid of the engorgement by sacrificing and using packs of citrate of soda to keep up the bleeding. Our final solution—and it is proving more or less successful—is even pressure. We use a fine marine sponge wrung out as dry as possible and applied under bandage pressure, over xeroform ointment gauze. At the end of one, two or three weeks, depending upon how you feel about it, the dressing is removed and the graft examined. If you are sure it is clean two weeks is better; if doubtful about the cleanliness one week is best. If the tension has been just right it will not have choked to death with blood nor will it have died of ischemia. There is still one more complication to guard against. The lack of vasomotor control is apt to raise vesicles in the second or third week and then the trouble starts. These may become infected from bacteria within the skin and unless controlled much of the graft may even now be destroyed. I have found that painting the desquamated surface with 1 per cent aquaous solution of silver nitrate once a day tends to control these inroads.

By following the above three rules we are succeeding with a large percentage of our full thickness skin grafts.

PRESENT DAY OBSTETRICAL PROCEDURE*

By T. S. Field, M. D.,
Jacksonville, Fla.

Obstetrics is the branch of medicine, in the practice of which the physician becomes the subject of more unjust criticism and the object of more undeserved praise than in any other branch. In addition, he is the recipient of fees more widely at variance with the services rendered than in any other line of endeavor.

The reasons for the truths stated in the above sentence are mainly two: first, custom, for obstetrics has ever been considered a very natural physiological function attended with little risk, and the accoucheur has, from time immemorial, received small recompense for his labors; second, the fact that, with the exception of a very limited number of specialists in other lines, everybody does obstetrics of one kind or another. Because the general public has no adequate method of choosing intelligently between an obstetrician and a doctor who delivers babies, these facts make for keen competition in securing patients and result in the reduction of fees. The patient who feels that $500 is a reasonable fee for the removal of his acute appendix would have convulsions upon the receipt of a bill for $150 for the delivery, prenatal and postnatal care of his wife, and yet the obstetrical procedure carries a double responsibility and frequently calls for much more competent judgment and skill, not to speak of the time and labor involved.

The most difficult feature of obstetrics is the heavy sense of responsibility which the obstetrician bears. It often is the deciding factor which warps our judgment. After a highly nervous woman has been in labor for several hours, begging for relief, and the anxious husband or mother is constantly importuning us to do something for her, that sense of responsibility for the life of the unborn child will inject itself into the harassed mind of the obstetrician and perhaps be the deciding factor

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between giving nature her full chance and interfering. Someone has said:

"Without responsibility there can be no efficiency, and without efficiency success can only be accidental."

Newell, in his monograph on "Cesarean Section," has correctly paragraphed the modern practice of midwifery in the hands of the general practitioner. He says:

"As obstetrics is ordinarily practiced it is assumed that every pregnant woman is a good risk for child birth until symptoms arise which call for special treatment, and these symptoms are often not appreciated until it is too late for a satisfactory result to be obtained. For the best good of our patients every woman should be looked upon as abnormal for childbearing until a painstaking examination proves that her interests will not suffer if she does not receive special care. Then, and only then, should she be treated as a routine case."

A physician who does obstetrics without bearing in mind the many dangers attendant upon pregnancy and delivery, and who accepts cases for delivery without preliminary examination to determine the patient's physical fitness both to carry and deliver the child, has no sense of responsibility. The doctor who accepts a patient for delivery upon her statement of pregnancy and dates and then forgets her until he is called to her in labor ought to be a relic of the dark ages, but, unfortunately, he is ever with us.

It is a sad commentary upon our progress to note that the still birth percentage still stands at the same old 5 per cent that we were taught in school; that the number of deaths from post partum sepsis still continues to average over 20,000 annually in the registration area in this country, and that we are still in the dark as to the cause, and ofttimes widely at variance in the treatment, of the toxemias of pregnancy.

We have made progress in many lines of obstetrical procedure. The carbohydrate diet regime in the early toxemias has produced really remarkable results. Pre- and post-natal care has come to the fore, reducing the maternal mortality and morbidity to a remarkable degree. Cesarean section has been perfected. But the fact that we are still floundering around is evidenced by the attempts to introduce innovations in obstetrical practice.

The physician is doing his best to make labor painless, or as nearly so as possible, in an endeavor to induce women to have at least one, if not more children. Patients are clamoring for painless labors. One of the first questions asked by a woman presenting herself for her preliminary examination is, "Doctor, do you give gas?" If not, she seeks a painless obstetrician elsewhere. This propaganda has led us from the few whiffs of chloroform as the head comes through the introitus, to the Potter version. Dr. Potter, himself an exceedingly clever operator, is leading many of us who are not so well equipped into serious difficulties in our endeavor to help suffering womanhood.

The requisites of a good obstetrician are: a sound knowledge of the principles and mechanics of obstetrics, common sense, good judgment, and last, but by no means least, patience. With this equipment he will not be rushed or pushed into unnecessary procedures to shorten a natural labor. Infant mortality and morbidity will be reduced to a minimum, and he will practice as nearly as possible ideal obstetrics.

What is the ideal to which we aspire? It is to bring a healthy mother up to the ordeal of labor in the best possible shape to go through it safely; to deliver her as painlessly as possible with due regard to the life of the child and her own soft tissues; to send back to her position in the world a woman fitted to perform her duties; and to bring into the world a healthy child fitted for the struggle for existence.

To attain these ends we must have a perfect knowledge of our patient from the start. When a patient presents herself to the physician in the early stages of pregnancy it is his duty to discover, if possible, first, whether his patient will be able to carry her child to term or not; second, whether she will be able to deliver it normally at term, and third, whether she will have a healthy baby.

A general physical examination then is our first step. Hunt for foci of infection as a cause of toxemias. Make a blood pressure and urine record for future reference. A routine Wassermann will ofttimes surprise you. A careful history, with special reference to previous labors in a multipara and menstrual history in both multiparae and primiparae, is an essential. With these points especially stressed, the

examination proceeds like any general physical examination, from head to foot. In addition we measure the pregnant woman very carefully, that we may properly prognosticate the difficulty or ease of the passage of the fetal ovoid during labor. This original examination permits the physician to put his patient in the best possible physical shape to carry her baby. We treat the unborn baby through the placental circulation for syphilis, should the mother's blood be found positive. In this connection permit me to state that because the mother's blood is negative you have not ruled out that factor until you have also examined the father's blood. This should be resorted to in suspected cases.

We must prepare in advance for a premature induction of labor in a contracted pelvis, or prepare the family for the application of forceps or section.

The patient is then instructed as to diet, care of the teeth and nipples, exercise to keep the muscles in good shape for the labor, and the necessity of routine urine examinations and blood pressure readings. I take a good deal of time explaining to new patients just why I require these examinations, and I find that, with very few exceptions, they are ready and willing to come to the office for them and appreciate this attention. An elaborated typewritten copy of these verbal instructions is then given the patient to take home and peruse. On this sheet in heavy black type are warnings against a diet high in proteins and the warning signs of toxemia.

My experience has been that the vomiting of pregnancy is more in text books than in fact. When I find a patient vomiting I look first for a high protein diet with consequent intestinal toxemia, then for a focus of infection. The teeth are often offenders. I have seen a case of persistent vomiting cured by the removal of one abscessed tooth. Pyelitis is far more frequent in pregnancy than one would naturally expect and is a complication often overlooked by the general practitioner. It is a frequent cause of vomiting in the early months.

Our knowledge of the toxemias of pregnancy is largely theoretical. Kosmak calls eclampsia the disease of theories. We have a large number to choose from and almost as many remedies as there are theories. It is not my intention to discuss eclampsia, but I do wish to say that the term is a misnomer. It was so named because it came on "in a flash." It does not. There is plenty of warning, if you are on the lookout for the impending signs. It is my purpose to bring to your attention the fact that we are warned of the approach of this dreaded complication, and it is our business to read those signs correctly and institute treatment to avert this disaster. The aim of our prenatal care should be the averting of disastrous complications. Forewarned is forearmed.

A routine physical examination at the seventh month is invaluable. It is a complete check on the first examination. One picks up details missed in the first examination and has more definite knowledge of how the maternal organism is carrying its burden. At this time it is often possible to discover a breech, and by watching the patient carefully until term convert it into a vertex and deliver it as such. I have converted and delivered no less than three in the past two months. My experiences with breeches, particularly in primipara, has made me doubly careful in hunting them out prior to delivery and converting them by external podalic version, which is an extremely simple procedure in most cases. I heard one obstetrician make the statement that he made it a rule to do a cesarean section on all breech cases. I do not, but I do make it a rule to discover them prior to labor and convert them if possible. This rule has saved me much trouble, many lacerations, and has cut down my stillbirth mortality, not to speak of saving the mother these same and many other troubles.

At the time of the original examination, all mothers are told that they will be expected to go to the hospital. I consider obstetrics a surgical procedure, and I face a delivery in the home with the same trepidation that I face a surgical operation in a private home. Economically, the average patient is better off in a hospital. She can get a private room for $25 a week. The use of the delivery room adds $5 to the first week, which is made up by allowing her to go home on the eleventh day.

I frequently send my patients to the hospital for the delivery and send them home in an ambulance the following day, in cases of mothers with other children for whom there is no one at home to care, rather than deliver them in the house.

When the patient is in labor I seldom make a vaginal examination, and only then for cause. I am not curious about the stage of dilatation or rotation unless the labor is protracted. The patient is shaved as for any vaginal operation. Iodin preparation is used entirely. I would much rather do a perineorrhaphy with the usual obstetrical preparation than deliver a woman without the usual perineorrhaphy preparation.

The patient's and baby's condition can best be judged by their circulation, and it is a mistake to hasten a labor when the maternal heart rate is not accelerated, unless the baby shows signs of pressure by an acceleration or slowing of its heart beat. Many a mother suffers from a chronic endocervicitis due to the manual dilatation of the cervix to hasten labor or the use of pituitrin before the cervix is fully dilated. I am personally acquainted with eight babies who are idiots from an injury directly traceable to the use of pituitrin. I seldom use pituitrin. When I do use it, it is for inertia uteri, with the head on the perineum and the cervix fully dilated, in a multipara. When given, the dose is never larger than three minims. It has been my experience that if pituitrin is going to be of service three minims will do the required work.

I make it a rule to catheterize all patients as soon as they are draped for delivery. I believe that I may save my patients from a submucous laceration of the prevesical fascia and utero-vesical ligaments, with resultant cystocele, by this rule.

Patients who are suffering are given gas or ether throughout the painful part of the second stage with the pains. I have never seen any ill effects from this yet.

Immediately upon birth the baby's mouth is cleansed of mucus. He is then greased with sterile vaseline while the cord is still pulsating. When pulsation ceases the cord is tied and cut and a sterile dressing applied which does not have to be removed until the baby is ready to be bathed. By greasing and wiping off the baby at this time no time is wasted and the baby is not subjected to an oiling by the nurse when she finds time, at which time he is usually unnecessarily exposed. And the cord dressing has one handling cut out, which eliminates one chance of infection to the cord.

The cord tied, dressing and binder applied, silver is put into the baby's eyes and he is turned over to the nurse. The mother is then inspected for lacerations of the cervix and perineum, and if any are found these are repaired at this time, before the delivery of the placenta. In cases where episiotomy is necessary it is my practice to place at least one suture in the perineum before the episiotomy is done. The ends are clamped and the proper restoration of the parts is assured by this procedure.

Sufficient time will usually have elapsed by this time to allow the placenta to separate, and if it does not expel itself within twenty minutes the uterus is gently kneaded. No force is ever used, as this often causes tearing of the placental villi and retention of bits in the uterus. We all know that the best safeguard against sepsis is an empty uterus.

Ergot is not given routinely. There is as much excuse for giving ergot routinely as there is for taking out life insurance every time one rides upon a train, and no more. This is one of the many customs which have been handed down from time immemorial, and is a pregnant illustration of the lack of rapid progress in obstetrical thinking.

Post partum, the patient is allowed to move in any position. The bed is usually raised during a part of every day to insure drainage. She is given soft diet at once if she is not nauseated and regular diet within forty-eight hours in normal cases. The baby is put to the breast every two hours from the start until the milk comes in, for the effect upon the involution of the uterus and to stimulate the breasts as well. If uncomfortable from inability to void she is catheterized, and if she had severe after-pains she is given a narcotic if necessary. She is allowed to sit up in bed from the fourth or fifth day on, corresponding to her condition. The average patient is

allowed out of bed on the tenth day and allowed to go home on the eleventh after a vaginal examination. If the uterus is found retrodisplaced a pessary (Albert-Smith) is inserted as soon as the lochia has ceased.

All patients are required to come to the office for a routine discharge examination in the sixth week, at which time their general physical condition is checked. The baby is looked over. A vaginal examination is made, and any defect that is correctable by office treatment is corrected. This includes raw areas left from lacerations, anal fissures, granulating areas on the cervix, and insertion of a pessary for retrodisplacements. The patient is told of any defects and advised how to remedy or have them remedied.

This is my idea of the minimum requirement in the ideal handling of an obstetrical case. My idea in this paper is to suggest that we standardize the handling of obstetrical cases along these lines and educate the general public to differentiate between the man who is doing his work well and the one who is handling his obstetrical cases by guess and by luck. When we can educate the public up to the point of expecting this we shall effectively reduce maternal and fetal mortality and morbidity, and not until then.

DISCUSSION

Dr. Robert B. McIver, Jacksonville, Fla.—To my mind this resume of Dr. Field's may be taken up under two heads: first, that prenatal care requires the accomplishments of the careful internist; and second, that delivery often calls forth sound surgical judgment. Prenatal care is dependent upon careful preliminary examination, and treating obstetrics as a surgical procedure not only brings out the qualities of the surgeon as far as technic is concerned, but, more important, it develops surgical judgment.

In the service we have had together in Jacksonville the procedure he has outlined has been carried out in so far as possible. Of course, in a charity service, cases are admitted that we have not seen beforehand. Many cases have had no history taken, no urinalysis, and no blood pressure reading. The damage is already done. However, from the time they come into the hospital until they go out, a careful routine is followed, and it is surprising how infrequently it becomes necessary to resort to radical obstetrical procedures.

Dr. Thos. B. Sellers, New Orleans, La.—Dr. Field stated that he only delivered women in a hospital. The sending of all cases to hospitals is convenient, and personally I prefer it, yet I do not think the obstetrician should limit himself to hospital practice, especially with multiparae. So many women object to going to the hospital and many of our obstetricians refuse to deliver the case in the home; consequently they are forced to get other doctors who are not so well equipped. It is more convenient and possibly preferable, from a surgeon's viewpoint, in a hospital, but surely we can equip a home to handle a case with a fair degree of ease and safety to both mother and child, if the patient demands a home delivery.

I would like to know at what time Dr. Field rotates his abnormal presentations.

I am a strong advocate of the use of nitrous oxid, oxygen analgesia and anesthesia in obstetrics. I have used McKessen's self-administering apparatus for the past two and one-half years, and it has solved the anesthetic problem for me. I usually give morphin the latter part of the first stage, and start the nitrous oxid when the pain becomes severe. I do not wait for full dilatation to start my anesthetic.

I am not an advocate of "twilight sleep."

Dr. James R. Garber, Birmingham, Ala.—The precautionary measures that Dr. Field brought out are extremely wholesome, but I was impressed with the contrast between this paper and Dr. Levy's discussion yesterday. Dr. Levy maintained that we find a good many abnormalities in our eagerness to do intensive prenatal care. I believe unless you can recognize the indices and give them their proper evaluation, there may be some error in this regard, but the man who is looking for such indices of trouble will err on the side of safety rather than neglect. It would be a worth-while lesson for the members to carry home, that we must be forever on the lookout for trouble.

A note of conservatism at the time of actual parturition is extremely valuable. One should never conduct a labor case according to the time equation. What does it matter if a case has been in labor forty-eight hours, provided the maternal and fetal conditions are satisfactory? I see no reason to resort to haste in such cases.

The next feature is the question of routine therapy in obstetrics. I heartily endorse his ideas with reference to ergot and pituitrin. The more I resort to these drugs the less merit I find in them. The most important thing about ergot is that the nurse will take it for granted that because a patient has had ergot she can neglect her the first three or four hours post partum and not give the attention that is so important.

Dr. W. G. Bogart, Chattanooga, Tenn.—We must be careful about advising our patients to go to a hospital, for we may put them in the hands of those who are not able to take care of them. I am sure, however, that we should require just as much at the hands of our patients and of our attendants as the surgeons do. We must put it on a high surgical basis. The surgeon, as a rule, has only one life at stake, while we have two, and for that reason it is more important that our standards be as high and the skill demanded as great.

As far as trying to force our patients to go to the hospital is concerned, we cannot do it if we try.

I would like to ask Dr. Sellers when he begins his anesthetic, in the first stage or the second.

Dr. George F. Pendleton, Kansas City, Mo.—Dr. Field is a man after my own heart, safe, sane and logical. I wish to ask him his particular reason for doing as he does. For instance, the baby is born, and there is a waiting of four to six minutes while the blood is passing from the placenta. He waits and cuts the cord and then inspects the vulva. It seems to me he is wasting time under heavy anesthesia. For that reason as soon as the baby is born I let it lie on its right side, cover it up, and then inspect the vulva. If I need to do any repair, I start right in there. Sometimes you are through the repair by the time the cord is cut. It saves a few minutes.

The second point is the question of allowing the patient to sit up in bed in five days. Surgically, that is a good point. Fundamentally, the quicker you get the patient up and get her to eating, the better off she is. But to go back to a little anatomy, this uterus not pregnant weighs about two ounces and it is held up by small ligaments. Dr. Reder told us yesterday that in the first few months of pregnancy he puts in a pessary to help hold up the added weight in the uterus. By and by the uterus swells up and the baby lies on the inlet and holds the uterus up and there is no weight on the ligaments. Then the baby is suddenly delivered, the uterus shrivels down. At full term it weighs two pounds. It takes at least ten or twelve days for this uterus to come down into shape anywhere near its original two ounces. At the end of five days the uterus is still heavy, and if you allow the patient to sit up the uterus sinks down into the pelvis and pulls on these small ligaments. I am coming more and more to feel that the so-called "female" diseases do not all come at the time of delivery. They come in the after-treatment of our patients. I keep my patients flat in bed and mostly on their sides and abdomen until the red is out of the discharge. I know then the uterus is pretty well involuted. Then I begin to allow them to sit up. I believe women get on their feet too soon. They go back to work too soon. If you keep them flat on the back an even two weeks, and gradually begin to let them up, the small ligaments will be protected and much of the so-called female trouble will be avoided.

Dr. Field (closing).—Being primarily a gynecologist and having three services in hospitals in Jacksonville, I make it a rule never to do house obstetrics. I can do these cases much more easily at the hospital, and it saves time. I believe that in a majority of instances obstetrics is a surgical procedure, and while Crile can operate in a bedroom, and I have done a laparotomy in a private house in the early days in Florida, nevertheless I do not do it from choice.

I rotate a breech in the last two weeks. If I find a patient with a breech presentation in routine examination about the seventh month, I have her come back at the middle of the eighth month and then do a rotation. Often the child will rotate itself, so I do not bother to rotate a breech at the seventh month.

I believe that the self-administration of nitrous oxid is a fairly safe procedure in a hospital where you have an oxygen tank; but I am decidedly against it in the home where you have an apparatus without an oxygen tank. You can pick up a paper almost any day and see where a dentist killed a patient in the office with nitrous oxid. It is an unsafe procedure.

We all have had patients who were in apparently perfect health, and yet they had a bad time at delivery. If you cannot judge a normal woman, how can you judge an abnormal one, if you do not watch her enough to pick out the abnormalities in the first place?

The trouble I find with ergot is when it is given routinely without orders.

The stage for anesthesia depends upon the patient. Some patients have practically no pain and do not require an anesthetic; some are hysterical and require it early.

My patients are never under an anesthetic after the head passes the perineum. I have the baby greased and wiped off while the cord is pulsating, then apply the dressing, which obviates the necessity of the nurse's taking the baby into a room with lower temperature or near an open window to grease it or bathe it.

As to getting the patient up early, that has been the result of my observations as a gynecologist. I find there are plenty of uteri that are heavy that are held up well in position with the patient walking around. One factor in maintaining the position of the uterus is intra-abdominal pressure on its posterior face. When that pressure is there the uterus cannot get out of position. Retroversion is usually caused either by wasting disease or by relaxed perineal outlet. If the vaginal wall is intact posteriorly and the ligaments are in shape it is better to get the patient up early, both for drainage and because exercise helps the involution.

ILEO-RECTO-VESICAL-FISTULA, PROBABLY OF LUETIC ORIGIN

By Edgar G. Ballenger, M.D., F.A.C.S.,
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and
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The following history directs attention to an unusual condition, which the history and post mortem findings lead us to think was due to syphilis.

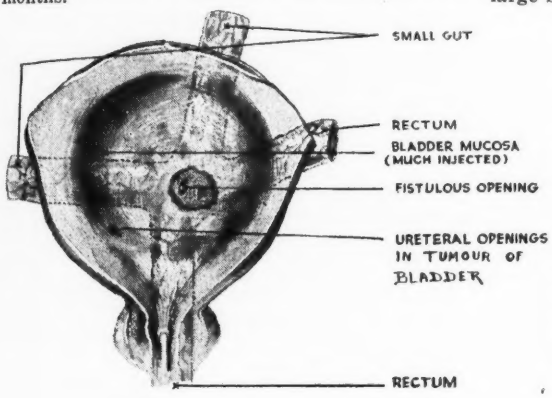
The specimen obtained at post mortem indicated that a gumma had formed on the bladder wall and surrounded a section of

intestine and the rectum. It must have undergone a necrotic change which permitted part of the gut to protrude into the bladder, where it opened. The growth was probably of considerable size, and under the influence of antispecific remedies became smaller. Unless it developed in this manner, it would be very difficult to explain the post mortem findings.

CASE REPORT

A negro, 38 years old, was admitted to the hospital November 7, 1922, complaining of an aching sensation in the penis after micturition.

Past History.—There was a sore on the penis three years previous to admission. He had been blind in the right eye since an injury five years previously. His bowels had been very irregular for several months. There had been a loss of about 15 pounds weight during the preceding four months.



SEMI-SCHEMATIC VIEW OF SPECIMEN

Present Illness.—The patient dated his trouble back about four weeks. At that time he had a sudden sharp pain in the left flank, which extended downward, finally becoming supra-pubic, where it remained as a dull aching sensation for about six hours, and gradually wore off entirely. From that time, however, he noted this aching sensation over his "bladder" for a short time following urination. Later this pain grew worse and was referred to the penis. On the morning of the day of admission he passed, per urethra, a substance which he thought was fluid feces and some blood mixed with his urine. After admission, his urine contained this same substance, which he described as fluid feces, but without blood. He passed urine three or four times at night and two or three times during the day.

Physical examination revealed a rather emaciated individual. There was an opacity in the right cornea. The teeth were in a very poor state of preservation and eight were missing. The anterior and posterior cervical lymph nodes were moderately enlarged. The chest was mildly emphysematous. There was a slight fullness in the iliac fossa, which appeared to be due to a dilated colon at that point. This region was slightly tender. The physical examination was otherwise negative.

Laboratory Findings.—The urine was foul smelling, cloudy and of a muddy color. It was alkaline, contained a trace of albumin, pus cells and many bacteria. These proved to be streptococci, staphylococci, colon bacilli and a large gram-positive bacillus.

Blood Count:

White blood cells	2,600
Polynmorphonuclear leucocytes	83%
Small lymphocytes	15%
Large lymphocytes	2%
Hemoglobin	70%
Wassermann reaction	++++

X-ray of the chest was negative.

An x-ray after a barium enema showed the large bowel irregularly filled with barium, due to a large accumulation of gas in the colon, but no evidence of a recto-vesical fistula.

Methylene blue injected per rectum did not appear in the urine.

Cystoscopic Examination.—He was cystoscoped first by one of the members of the staff, who reported a growth in the bladder.

Later he was again cystoscoped and this tumor was seen to be a non-encrusted, "beefy," non-papillomatous projection into the bladder. No fistulous opening could be detected, and the mass, which was about the size of a small English walnut, did not present the gross characteristics of a new growth. It suggested the possibility of gumma. The positive Wassermann previously mentioned supported this view.

Clinical Course.—The patient's temperature was normal and his pulse between 80 and 100 during his entire stay in the hospital. He was put on antiluetic treatment (arsphenamine and salicylate of mercury) and also was given urotropin. His condition remained much the same, though, for several weeks and he was more comfortable, and his urine showed a tendency to clear up. Later neutral acriflavin by mouth in three grain doses was tried three times a day, but without avail. He felt a little better, due probably to staying in bed. After about the fourth week he began to lose ground, gradually getting weaker and weaker until he died, seven weeks after admission. During the last two weeks of life there was a troublesome diarrhea, which had to be checked with opiates.

Autopsy Findings.—The only points of interest in the autopsy were in connection with his local condition. Just behind and at the upper posterior edge of the bladder, and slightly to the end of the midline, there was a hard mass from and into which ran loops of small gut, and the upper

end of the rectum. This mass was firmly attached to the external wall of the bladder and extended through it, presenting on the inner surface. There was a fistulous opening through this mass, which connected the bladder cavity with the loops of intestine.

Microscopic sections were made from four or five different points in this mass, but no evidence of new growth or tuberculosis could be found. The tissue presented the histologic picture of chronic inflammation, which led us to the assumption that the lesion probably was a gumma which had eventually broken through into the bladder at a weakened point. The hardness of the mass probably was due to a gumma plus the induration of the tissues in this region, which naturally responded, as would be expected, to the ever present sources of infection. At autopsy the patient presented evidence of arrested lesions of syphilis elsewhere.

A REVIEW OF SIX CASES OF MECKEL'S DIVERTICULUM WITH REFERENCE TO CAUTION IN RESECTIONS*

By R. M. Harbin, M.D., F.A.C.S.,
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During a fourteen year period ending October 1, 1922, there have occurred in our clinic 1813 abdominal operations in which the incidence of six cases (0.33%) of Meckel's diverticulum was observed. While in certain complicated cases this incidence may have escaped observation, it has been the rule in the main to search the lower ileum for this deformity. The condition, while comparatively rare, is attended in acute inflammatory cases by a high operative mortality because of certain difficulties of early diagnosis. Two of these cases were reported† in 1917 with reference to umbilical disorders of infancy. For the sake of brevity the bibliography of the subject will be omitted. The main point I wish to bring out in this discussion is a faulty technic in cases No. 2 and 3 that seemed to produce so much dysfunction that secondary operations became necessary. Because of the rarity of this abnormality the amount of clinical experience is not sufficient to warrant any standard technic of operations and these observations are offered for their face value.

It is rarely, if ever, possible to make a pre-operative diagnosis of the presence of a diverticulum, but there are characteristic symptoms which would mark a case as being an atypical acute abdomen.

Case 2 gave symptoms of ill defined intestinal disturbance and was only detected in the course of another operation.

Cases 1, 3 and 5 were diagnosed acute appendicitis and case 4, probably mesenteric thrombosis, while case 6 was treated for acute intestinal obstruction.

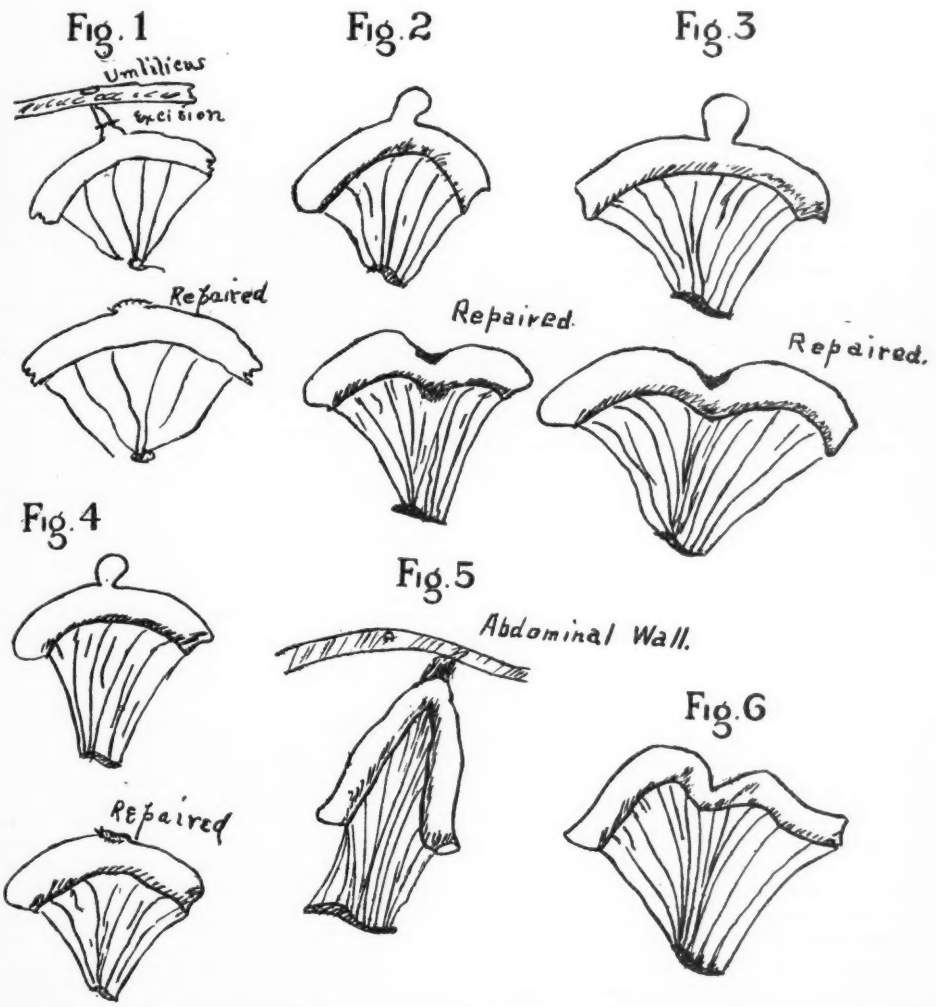
In the early course of an acute attack the mechanical symptoms of obstruction with a correspondingly lower grade of leucocytosis mark the case as one for critical study, because the great majority of cases of intestinal obstruction proceed directly or indirectly from the effect of peritonitis which would give a more definite history.

Case I.—A boy twelve and one-half years gave a history of abdominal pains since infancy. At four months old he had a pedicle excised from the umbilicus. He gave a history of one attack of colic one month previously. I saw him at 9:00 p. m. and again the next day. He had a leucocyte count of 13,800 and at 9:00 p. m. he was operated upon and the appearance of the diverticulum is shown in Figure 1. He has remained cured.

Case II.—Mrs. Blank, age 31, mother of 6 children, the youngest two and one-half years, was operated upon for uterine retroversion and relaxed vaginal outlet. Along with these troubles she had obscure intestinal disturbances with recurring attacks of constipation with inability to expel intestinal gases. A diverticulum was found fourteen inches from the ileo-cecal valve. It was ligated and excised (Figure 2) and inverted by a row of Lembert sutures at right angles to the course of the intestines. Convalescence was normal but intestinal disturbances became more pronounced with symptoms of violent colic after leaving the hospital and in six months she returned for a secondary operation. After opening the abdomen the upper limb of the intestine was found to be attached to the abdominal parietes. Notwithstanding the awkward shape of the site of the diverticulum it was thought that separation of the adhesion to the abdominal wall would give her relief. However, colicy disturbances continued and were occasionally attended by mucous diarrhea. Owing to certain domestic and neurotic troubles, the expectant treatment was adopted and in about four years the symptoms wore away through a sort of functional adjustment.

*Read in the Section on Surgery, Southern Medical Association, Sixteenth Annual Meeting, Chattanooga, Tenn., Nov. 13-16, 1922.

†Harbin, R. M.: "Meckel's Diverticulum: With Special Reference to Umbilical Disorders of Infancy," Sou. Med. Jr., Vol. 10, No. 2, (February, 1917).



Case III.—A young man was referred to us with acute appendicitis. We concurred in the diagnosis, since the symptoms had lasted twenty-four hours with pain and vomiting and a leucocyte count of 10,000. The appendix showed only a slight degree of pathology and was removed. About twelve inches from the ileo-cecal valve a Meckel's diverticulum was discovered with the appearance of acute inflammation (Figure 3). Within forty-eight hours signs of acute intestinal obstruction developed which required resection of the gut with a side to side anastomosis. Since then he has had no trouble whatever.

Case IV.—A girl 17 years old was sent to the hospital by the attending physicians, having been sick thirty-two hours with agonizing pain and obstinate constipation. She vomited excessively, the urine was negative, leucocytosis 23,200, and abdomen massively distended more on the right side. Her general condition was critical. A tentative diagnosis of mesenteric thrombosis was made and when the abdomen was opened a pedunculated pouch five inches long was observed bound in a coil of gangrenous intestine producing a volvulus. Two and a half feet of ileum was resected but the patient died in twelve hours.

Case V.—A healthy pupil nurse nineteen years old was diagnosed as a case of subacute appendicitis. Only within the preceding year was there a history of slight abdominal pain and soreness, but for a week there were mild symp-

toms of distress with slight nausea. Urinalysis showed only a trace of albumin, while the leucocyte count was 8,700 and temperature and pulse were normal. Through a right rectus incision an atrophied appendix was removed and a Meckel's diverticulum three inches long was excised and repaired as indicated by Figure No. 5. Convalescence was prompt and a cure followed.

Case VI.—A three-year-old boy was referred to the hospital by the attending physician who had observed the vomitus as being fecal in appearance. He had suffered with abdominal distress for four days and vomited occasionally. His bowels had not acted in three days. He had an attack of vomiting seven months previously. The abdomen was much distended, the coils of intestines being apparent through the thin abdominal wall. Urinalysis was negative and the leucocyte count was 9,806. He had some of the appearances of gastro-intestinal toxemia and was held for observation for twelve hours at which time the diagnosis of acute intestinal obstruction was made. The leucocyte count remained unchanged. Through a midline incision there appeared a gangrenous Meckel's diverticulum the size of a hen egg (Figure 6) enwrapped by coils of intestines. The diverticulum was resected, and the patient died in twelve hours.

CONCLUSION

We have observed that adhesions which pull the periphery of the intestine to a more acute angle (Figure 6) do not necessarily interfere seriously with the function of peristalsis, but any slight angulation in the opposite direction with a narrowed lumen (Figure 7) has a more serious effect. This we believe happened in cases 2 and 3, and in resections of diverticulum having broad bases this should be borne in mind. Enough of the stump should be left to avoid this effect, and infolding Lembert sutures should be applied in a line parallel with the gut instead of at right angles.

DISCUSSION

Dr. J. Shelton Horsley, Richmond, Va.—There are a great many deaths from intestinal obstructions that occur as the result of Meckel's diverticulum. I do not see how it is possible to make anything more than a guess at its cause before operation, that is, as to a definite cause. Whenever you find a Meckel's diverticulum it should be removed, just as most of us remove the appendix in operating for other abdominal conditions. I have adopted a simple technic that makes it quite easy. By putting a lateral blood vessel clamp on the base of the diverticulum, it can be cut off and sutured over with catgut to control the bleeding and another row of linen sutures is placed over that. It does not take any longer to remove the appendix and it eliminates a decided source of danger.

One thing I would like to mention in regard to intestinal resection. Almost every case is adapted to end-to-end union. That is undoubtedly the physiological method if it can be used without too much danger of obstruction. A great many experimenters on dogs, one of whom I am, will tell you that you cannot produce obstruction by turning in too much diaphragm in the bowel of a dog. That is true, but not in the human being. I have had two patients die from turning in too much diaphragm. We must remember that the intestine in the human being is much weaker than in the dog. A dog can overcome almost any diaphragm, but a human being cannot.

There is a type of case in which you cannot satisfactorily do an end-to-end suture. The mesenteric space where the mesentery splits to envelop the bowel should, of course, be clamped off and sealed before the bowel is opened. If that is small and comes up as a narrow space there is no trouble in the end-to-end, particularly if each space is not approximated to the opposite space. Then a peritoneal covering will come over on each surface. But if you have a very large space it is very difficult to secure an end-to-end union. If you shove up these spaces into the lumen you may have obstruction. In this type of case I think it is best to close the ends and do a lateral anastomosis. While this is not physiologic it is safer than the end-to-end, where you have a fat mesentery and a small lumen.

Dr. G. T. Tyler, Greenville, S. C.—Several years ago, it was my fortune to attend the autopsies, at Blockley Hospital in Philadelphia, for part of the summer. In seventy autopsies, there were four cases where Meckel's diverticulum was found. I think that is the usual incidence. In none of these was there any connection between the diverticulum and the umbilicus. Another interesting point was that none of them was more than thirty-six inches above the ileo-cecal valve. The finding is frequent enough to make us be on the lookout for it and to examine the last yard of ileum when a laparotomy is done. If a diverticulum is found, removal is indicated, if it can be done without too much risk to the patient.

As to diagnosis, it is a question whether it can be made accurately when the patient comes with acute symptoms. The thing to do is to be on the out-look for it, and to treat it when we find it.

Dr. F. Webb Griffith, Asheville, N. C.—Last year I had two cases of Meckel's diverticulum. The first was in a child about 17 months old, who was brought in with all the symptoms of a general peritonitis. We naturally thought of a ruptured appendix. Operation revealed a normal appendix, but a ruptured diverticulum. After a stormy period of a week the patient recovered.

In the treatment of cases of diverticulum I am accustomed to put enterostomy clamps on the proximal and distal sides of the bowel, to cut off the diverticulum about a quarter of an inch from its base and then to suture it in the long axis of the bowel. In that way there is very little danger of obstruction.

Dr. Wm. T. Black, Memphis, Tenn.—The diverticula of which the author speaks are supposed to occur in about 2 per cent of people, usually within a short distance of the ileocecal valve, extending from the ileum. Diverticula are due to a failure of proper involution. In 98 per cent of people the omphalo-mesenteric duct is obliterated before birth, but in the remaining 2 per cent, parts of the duct remain and are present at birth. At times they remain patent throughout, and fecal matter comes through at the umbilical opening. In other cases they remain as a small cord, which is attached to the ileum and umbilicus. Where the diverticula are attached to the umbilicus, we find the most dangerous, as this is often attended with intestinal obstruction. The diverticulum assumes various shapes and sizes, but usually is smaller than the gut, and is open at the proximal end. These diverticula quite often concern the surgeon. In a great many cases of right sided pain a diverticulum is the cause. In all chronic cases of right sided pain a search should be made for a diverticulum. In fact, a search should be made in all chronic abdominal lesions, especially where sufficient pathology is not found at the time of operation to account for the symptoms present. Intestinal obstruction is frequently due to a Meckel's diverticulum. I have observed two such cases, and I have also previously reported two cases in which a tumor was growing from the distal end of a diverticulum. An x-ray barium picture will aid in making a diagnosis of the presence of a diverticulum. A diverticulum as a rule should be removed, but I have observed one case where the diverticulum's lumen was as large as the lumen of the ileum from which it sprang. Therefore, I did not see any reason for removing it. The fact that the feces in the ileum were liquid, and that the lumen of the diverticulum was as large as the lumen of the gut, and no peri-diverticular pathology was present, made me think it best not to remove this diverticulum.

PEPTIC ULCER AND ITS SURGICAL TREATMENT*

By M. J. Henry, M.D.,
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Of all the pathological conditions to which the abdominal viscera are subject, none has been more widely discussed, or has more interesting features than peptic ulcer.

By the term "peptic ulcer" is meant any ulceration of the mucosa alone, or the mucosa and underlying layers of the wall of the stomach and first portion of the duodenum. Ulcers of the chronic type usually involve the deeper layers of the wall of the viscus. Ulcers of the stomach and duodenum are considered as one, because of the fact that their etiology, symptoms and treatment are very similar.

This is a disease of early adult life, by far the greatest number of cases occurring between the ages of 20 and 40. Males are much more frequently affected than females, the proportion being about three of the former to one of the latter. It was formerly thought that the reverse was true but in recent years more accurate methods of diagnosis have disproven this contention by eliminating many cases presenting symptoms suggestive of ulcer, but really reflex in origin, from disease of the pelvic viscera.

The factors underlying the development of peptic ulcer are, even to this date, rather obscure. Many theories as to its etiology have been advanced but none has received the uncontested support of the entire medical profession.

At present the most discussed theories are the hyperacidity, trophic and bacterial invasion theories.

The hyperacidity theory had many advocates at one time. However, the knowledge that chronic peptic ulcer could be coincident with achylia, and that many cases of marked hyperacidity did not show ulceration led many observers to look further in search of the cause.

In 1915, Durante[1] demonstrated that peptic ulcers could be experimentally produced by interfering with the nerve supply of the mucosa, which in turn altered the blood supply, thus decreasing nutrition and rendering the tissue more subject to the digestive action of the gastric juices. Bevan[2] cites three factors in the production of ulcer, saying that "gastric juice with its power of digesting devitalized tissue, plus an area of lowered resistance, resulting usually from some injury or lesion of the blood vessels of the mucous membrane, plus the lowered resisting power of the individual, equals ulcer." Brown[3] quotes the theory first advanced by Virchow, "that ulcers are produced by the digestion of a certain portion of the mucosa by the proteolytic enzyme of the stomach, or its destruction by the corroding effect of the hydrochloric acid."

Rosenow[4], in his work on the selective localization of streptococci, has explained the formation of peptic ulcer as

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being due to the hematogenous invasion of the submucosa by streptococci. After having so frequently found streptococci in the depths of ulcers excised at operation and having produced peptic ulcers in laboratory animals by the intravenous injections of cultures of streptococci, he concludes that these facts "constitute good evidence that streptococci are not merely accidental or secondary invaders of the tissues, but are commonly the original cause as well as an important factor preventing the healing of the ulcer." The great attention clinicians give to the eliminating of all foci of infection attests the seriousness with which they consider this theory.

The symptoms enumerated by one suffering from a peptic ulcer are usually of such a characteristic nature that many patients are said to present an "ulcer complex." Some, however, do not have such a uniform set of symptoms, and in these the diagnosis is sometimes difficult to make. They are said to have an irregular ulcer history, such a one as is frequently found in gastric complaints of reflex origin.

It may be said, with reasonable safety, that a gastric ulcer cannot be differentiated from a duodenal one by subjective symptoms alone. Graham[5], though stating many points in the analysis of the history, which influence the clinician in deciding as to the localization of an ulcer, says: "He who meets defeat again and again at attempts at ulcer localization, will in time, even when the symptoms have met most of his requirements, come to feel less sure of his diagnosis than is comforting."

The so-called ulcer history is one in which the patient states that he has pain in the epigastrium, coming from two to five hours after eating; coming in attacks lasting from a few days to several months; and relieved by taking food or alkalis. In varying frequency, to these symptoms are added: seasonal influence, sour eructations or regurgitations, vomiting, hematemesis, and the passage of tarry stools. All these may be present in one case, though usually one or more of them is not found. Peptic ulcers sometimes have very irregular histories, and this is especially true of gastric ulcers, chronic inflammation of the gall-bladder often leading to a diagnosis of ulcer. A case recently coming under the writer's observation very clearly demonstrates the irregularity of some histories of peptic ulcer.

This was a woman, 48 years of age, presenting a history of rather marked aching in the left upper quadrant; no food ease; some ease from whisky; occasional vomiting; and sometimes pain at night.

Physical examination was negative except for the presence of tenderness and rigidity in the left upper quadrant. The blood examination showed: hemoglobin, 96 (Dare); erythrocytes, 4,860,000; leucocytes, 16,700; polymorphonuclears, 74.5 per cent; and otherwise negative. Urinalysis was negative. X-ray of the gall-bladder and urinary tract was negative. X-ray of the stomach and duodenum showed a deformity of the duodenal cap. X-ray diagnosis, duodenal ulcer.

This patient was operated upon by Dr. Irvin Abell, and an ulcer with marked induration was found on the superior and posterior walls of the duodenum. A posterior gastro-jejunostomy was done. The stomach, left lobe of liver, spleen, left kidney and left diaphragm were negative to palpation. The gall-bladder was thin walled and showed cobweb-like adhesions to the omentum and transverse colon. The patient took the anesthetic poorly, and because of her condition the appendix was not examined.

The day following the operation the patient stated that she was more comfortable than she had been for months, and she has remained symptom-free since the operation, a period of four months.

A carefully taken history usually leads the clinician to a correct diagnosis in ulcers of the stomach or duodenum. However, it is to the laboratory that the diagnostician turns for support for his conclusions. Of the laboratory examinations which shed light upon this condition, the analysis of the gastric contents, and the roentgen examination are the more important, the latter being the most important.

The gastric analysis may show an hyperacidity, a retention of food particles from a Riegel meal, or the presence of blood, which are strong corroborative evidence of the presence of ulcer.

The x-ray very frequently gives positive evidence of the presence or absence of ulcer, and when present, oftentimes, accurate localization of the lesion. Carman[6] states that from July 1, 1918, to Jan. 1, 1919, 343 patients upon whom a

diagnosis of peptic ulcer has been made at the roentgen examination, were operated upon. At operation 333 showed the presence of peptic ulcer, a percentage of correct diagnosis of 98.21 per cent. Could any other method alone show such a high percentage of correctness? It is the writer's opinion that the x-ray is of value in the diagnosis of peptic ulcer, in inverse ratio to the knowledge the roentgenologist has of the other clinical aspects of the case he is studying. When the roentgen diagnostician knows nothing of the history of the case he can give an opinion based upon the x-ray examination alone, and this is of more value to the clinician who must correlate all the clinical and laboratory data.

For many years there has been a very wide divergence of opinion existing between the gastro-enterologist and the treatment indicated in these cases, the gastro-enterologist looking upon practically all of them as being amenable to medical treatment, and the surgeon feeling that the great majority should be treated by operation. While, in the past few years there has been a gradual drawing nearer of the surgical and medical opinions, the extreme views are, however, still held by some. After a study of the indications for the surgical treatment of ulcer, as given by Sippy[7] in a recent article, one concludes that in that author's opinion very few cases of peptic ulcer should be treated surgically. On the other hand, Deaver[8], in an article of recent date maintains that nearly all cases eventually require surgical treatment. Many surgeons now advise a thorough course of treatment such as that known as the Sippy treatment, before any surgical procedure is attempted.

Until recently there was not much difference of opinion among surgeons as to the proper type of operation to employ in the usual cases of peptic ulcer. It was the more or less rare types of ulcer, or the complications of ulcer, that furnished the surgeons a topic for controversy. Latterly, however, many surgeons are questioning or deprecating the more or less established rules for treating ulcers, especially those occurring on the duodenal side of the pylorus. The treatment of gastric ulcer has not been the cause of so much argument, because of the more or less universally accepted theory, or fact, that gastric ulcers often undergo carcinomatous changes and consequently any treatment that fails to eliminate the ulcer falls decidedly short of being ideal.

Since Finney, 20 years ago, described his technic for treating ulcers near the pylorus, he and his disciples were, for a long time, practically the only objectors, in this country, to the more or less generally accepted belief that a gastro-enterostomy was the operation of choice in ulcers near the pylorus. However, in recent years the supporters of this procedure have found more opponents, mainly due to the realization that a gastro-enterostomy does not always accomplish the desired result.

Duodenal ulcer is now treated surgically by about five different types of operation: (a) excision of the ulcer; (b) gastro-jejunostomy; (c) pyloroplasty; (d) gastro-jejunostomy with excision or cautery of the ulcer; and (e) pyloroplasty with excision or cautery of the ulcer.

Simple excision of a duodenal ulcer is indicated only in those ulcers occurring at a distance of one-half inch or more from the pylorus, and situated on the anterior duodenal wall. When indicated, the operation described by Judd[9], that of excising the ulcer by means of an eliptical incision made transverse to the long axis of the bowel, is a practical one.

Gastro-jejunostomy alone, was, for a long time, considered the most rational operation for duodenal ulcer. However, there are now many surgeons who have changed their opinions and advocated other operations in its stead. W. J. Mayo[10], who, with his associates at the Mayo Clinic, has been a strong advocate of a simple gastro-jejunostomy, says that as satisfactory results can be obtained without the excision of the ulcer in 90 per cent of the cases, it is of questionable advisability to subject the one hundred to the added danger of an excision merely to save the ten from a second operation.

The advantages of a gastro-enterostomy are that the usually hyperacid condition of the stomach is overcome by the passage of the alkaline intestinal fluid into the

stomach, thus controlling the spasmodic condition brought on by the excessive acidity, and the promotion of a more rapid emptying of the gastric contents. This operation is most successful in those cases showing gastric retention. The arguments advanced against gastro-enterostomy are that it leaves the symptom-producing ulcer, and subjects the mucosa of the jejunum, which is normally bathed with an alkaline secretion, to the trauma of an hyperacid secretion, which in from two to three per cent of the cases produces a gastro-jejunal ulcer. This sequela occurred in 1.3 per cent of 3,700 cases reported by Eusterman[11].

Pyloroplasty has recently been advocated by an increasing number of surgeons. The fact that there is less disturbance of the normal anatomical arrangement than after gastro-jejunostomy, and consequently the danger of gastro-jejunal ulcer is eliminated, is the chief reason for its growing popularity. Finney[12] has, for years advocated this operation, with excision of the ulcer in certain cases of ulcer near the pylorus. Horsley[13] has described a type of pyloroplasty which he thinks is applicable to many cases of peptic ulcer, even those with obstruction, and constricting bands on the posterior wall. He[14] has recently reported 43 cases so treated. He states that when adhesions to other viscera than the gall-bladder are present the operation is not indicated.

A gastro-enterostomy or a pyloroplasty is often combined with an excision or cautery of the ulcer. When the ulcer is easily accessible the excision method can be used. Those ulcers which cannot be easily excised can oftentimes be destroyed by the actual cautery. The destruction or removal of the ulcer eliminates one objection to a gastro-enterostomy, and adds one advantage to a pyloroplasty.

In operations for gastric ulcers, four procedures may be followed: gastro-jejunostomy, gastro-jejunostomy with excision or cautery of the ulcer, pylorectomy and sleeve resection.

Gastro-jejunostomy, alone, is indicated only in cases where the ulcer cannot be reached to excise or cauterize it, and in cases in which the patient's condition does not justify the added time and risk to do more.

Ulcers on the anterior wall, on the greater curvature, or on the lesser curvature, or even on the posterior wall, situated at a distance from the pylorus can be treated by excision or cautery of the ulcer, followed by a gastro-jejunostomy.

In large ulcers, which are not adherent to surrounding viscera, a sleeve resection may be done. This operation is usually feasible in ulcers of the pars media only.

When the patient's condition permits, ulcers near the pylorus are best treated by pylorectomy. When the condition of the patient is critical the operation may be done in two stages, using the Billroth No. 2 method. This operation consists of an excision of the pyloric portion of the stomach, inverting the cut end of the duodenum, and the stump of the stomach, and then doing a gastro-enterostomy. It may be done in one or two stages.

The Polya type of pylorectomy has some advantages over the Billroth operation, especially when done according to Balfour's modification. Horsley[15] states that the Polya type of pylorectomy has chiefly three advantages in that it "Enables more of the stomach to be removed, because the wound by the old technic was infolded and carefully sutured, which takes at least an inch more of the stomach than when sutured directly to the jejunum; the nutrition of the stump of the stomach is augmented by applying to it a loop of jejunum whose blood supply has been unimpaired; and the time of the operation is shortened by removing the necessity for a gastro-enterostomy." Woolsey[16] has stated that in his hands the Polya operation has been the most satisfactory of all operations for peptic ulcer.

Simple excision of a gastric ulcer, is now rarely performed because of the fact that a large percentage of patients so treated, later required a gastro-enterostomy.

Acute perforation of an ulcer, is one condition in which all clinicians agree that an immediate operation is indicated, the percentage of recoveries being in proportion to the length of time elapsing between

the perforation and the operative closure of the opening.

It has long been a disputed question among surgeons whether or not simple closure of a perforation is all that is required in the surgical management of acute perforation. Those favoring the closure, without gastro-enterostomy, argue that many cases of acute perforation were previously free from any symptoms of chronic ulcer, and consequently, the perforation is the only feature requiring treatment; and that to do a posterior gastro-jejunostomy increases the danger of peritonitis, and also requires an unnecessary addition of time for completion of the operation. The advocates of closure followed by gastro-enterostomy answer these objections by saying that the peritonitis following the perforation is general, and consequently cannot be increased by making a new opening in the stomach; that the performance of a gastro-enterostomy requires a very few minutes; that it by altering the reaction of the gastric contents permits more permanent healing of the ulcer; and that it avoids the possibility of a secondary operation.

Surgeons are now beginning to realize that many of the unsatisfactory results met with in the past have been due to their failure to appreciate the fact that the patient was not cured as soon as the operation was completed; and that many cases of return of symptoms were due to a too rapid return of the patient to a regular diet.

To insure a higher percentage of symptom-free cases following the surgical treatment of ulcer, it is necessary that, for months after the operation, the patient be kept under observation, preferably by a competent internist, who can so regulate his habits and diet as to avoid the danger of post-operative ulcerations, by controlling the amount of food taken at one time, by avoiding foods which stimulate the flow of hydrochloric acid, and by the administration of alkalis to diminish the acidity of the peptic area should an hyperacidity exist.

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DISCUSSION

Dr. Irvin Abell, Louisville, Ky.—Accurate and definite knowledge regarding the etiology of peptic ulcer is not at hand. If the etiological factors that enter into the formation of peptic ulcer were all embraced or comprised in the one, small, circumscribed area in which ulcer begins, the excision of that would give us uniformly good results. We know from experience that this will not occur. Upon the fact that ulcers recur, both multiply and singly, is based the indication that there is something more than the pathology in the mucosa. If we accept the hematogenous idea, as presented by the essayist with others, then we can accept the recurrence of ulcer after it has been cured, as further blood borne infection, but the type of ulcer that occurs in the jejunum after gastro-enterostomy does not lend itself to such an explanation.

Again, one will observe cases from time to time that would lend credence to the contention made by some that peptic ulcer is but the expression of an underlying constitutional condition. Six years ago I did a sleeve resection for a chronic ulcer of the pars media of the lesser curvature. We had complete relief, but only temporarily. In 15 months this man returned presenting symptoms of ulcer. At the second operation multiple ulcers were found both proximal and distal to the former line of resection. Surely such an observation as this must lead one to think that there is something more than a local condition in such instances which gives rise to such a widespread recurrence of lesions. The unrest that exists in the profession today regarding the method of treatment of ulcers I think indicates

quite clearly that neither medicine nor surgery will cure all of them.

In our practice the operability is determined by two factors: the clinical history and the x-ray findings. The duration, chronicity, the hemorrhage, marked change in the stomach or duodenal wall as evidenced by x-ray examination, the interference with stomach drainage, the presence of disturbance of gastric function to such a degree that the strength and health of the individual are impaired, are to us clear indications that surgery in that particular group is the treatment of choice. In the beginning, the acute ulcers, those in which the history is of short duration, those in which there is no marked bleeding, those in which the disturbance of gastric function is still commensurate with activity of the individual, not interfering with his ability to work or his strength, these we feel can be treated about as satisfactorily by medicine as by surgery and should have the benefit of that treatment. I grant you that such symptoms will not always conform to the pathology that is present since it is practically impossible to correlate correctly the degree of symptoms with the extent of disease, without the aid of ocular inspection. Some cases of marked infiltration give a small amount of symptoms while others with a small ulcer defect will cause marked symptoms. I have seen perforation of a duodenal ulcer in a patient who was just out of bed where he had been for six weeks under treatment for a mild but definite ulcer syndrome. He was apparently free of symptoms and started to work, but a perforation occurred on the way, to his office. Such a clinical distinction, I grant, will not conform to the degree of pathology that is actually present.

When we come to the form of operation, as indicated by the essayist, we shall have much difference of opinion for the reason that the varying pathology present when the abdomen is opened will not always be amenable to any one type of operation. It must be adapted to the condition found upon opening the abdomen. If feasible the ulcer should be removed or destroyed. In a perforation of a duodenal ulcer into the head of the pancreas or a calloused ulcer involving the head of the pancreas, this would institute such active trauma that its use would be prohibitive and we have to be content with less. In the ulcers of the anterior duodenal wall we have employed excision without attempting posterior gastro-enterostomy. That particular series has given us satisfactory results to such a degree that we shall continue to employ such a procedure in ulcers so situated. In the duodenal ulcers that are not accessible we shall have to depend upon gastro-enterostomy; but here you will find that notwithstanding the assistance of our medical friends, and they give us great assistance, they will not all get well. I have seen one case of fatal hemorrhage in such a case. In the ulcers situated at or near the pylorus some type of pyloroplasty, particularly where the localization and accompanying pathology permit of mobilization and suture, I think is the ideal operation. It permits of removing the ulcer and gives drainage. It does not destroy the anatomic relations to any degree and the few we have done have given us satisfaction.

The type of ulcer that has given us trouble has been the chronic inflammatory ulcer along the lesser curvature near the pylorus and we have concluded that in this the only operation that will be satisfactory is the one described by the essayist as the Billroth No. 2 or the Polya. This goes back years ago but in these ulcers on the gastric side of the pylorus there is hardly any other operation that will so satisfactorily take care of them.

The sleeve resection, as indicated by the essayist, will take care of those large calloused ulcers in the lesser curvature, whereas resection with a cautery or knife, accompanied by posterior gastro-enterostomy gives satisfactory results in a majority of cases in which the ulcer is situated elsewhere.

We have confined our treatment of perforation chiefly to mere closure and most of the patients have remained symptom-free, the closure of the perforation alone being enough to relieve the symptoms.

Following the publication of Deaver's paper some years ago we began doing a posterior gastro-enterostomy in the cases in which the location of the ulcer was such that it formed a marked obstruction to the drainage. All of the patients so treated recovered and, with the exception of one, they are symptom-free.

Finally, I wish to make the statement that as my experience with peptic ulcer has become greater, my conviction has become more firm that it is not a medical or surgical proposition but that it belongs to both fields, and that only when the physician and surgeon collaborate in the preparation and treatment of the patient, and in the after-care and management of the patient, when you realize that the surgery, as expressed by the Chairman in his splendid address, is a means of permitting proper supervision of diet and proper after-treatment, then only will we obtain the most satisfactory results.

Dr. Lucius E. Burch, Nashville, Tenn.—This subject, at the present time, is the battle ground between the internist and the surgeon. I am of the opinion, as expressed by Dr. Abell, that these cases should be managed by both the internist and the surgeon, and I might also add, the roentgenologist. There has been much confusion in the past, due to the fact that many internists have treated patients with so-called ulcers where ulcers really did not exist, and the surgeon, not so many years back, has operated upon

cases where ulcer was not visible and of course with poor results.

In my discussion I shall limit myself to the treatment of this condition. I think both surgeon and internist will agree that the medical man should be given an opportunity to treat these cases first, and then if under proper medical supervision for a certain period of time the patient does not improve, the case should be referred to the surgeon.

I also take the view that in case of perforation a gastro-enterostomy should not be performed. The most important thing of all to be remembered is to save life, and the majority of cases that perforate will get well and remain well after the ulcer is closed.

It is impossible to lay down a hard and fast rule in regard to the selection of the operation and I do not believe we shall settle this problem at this meeting. Dr. Horsley, of Richmond, a member of this Section, has brought out an excellent operation for pyloroplasty, but it is applicable in only a limited number of cases. The results, however, in this limited number have been excellent. The ideal operation, of course, is the removal of the ulcer-bearing area. It is, however, an operation of a higher mortality than gastro-enterostomy or pyloroplasty, and for this reason it cannot always be used. At the present time I am of the opinion that the majority of cases are better handled by the removal or destruction of the ulcer, supplemented by a gastro-enterostomy. I feel that the last suggestion which the essayist made in his paper is a most important one, that regardless of the operation performed, the patient should be placed under careful medical supervision for quite a period of time following the operation.

Dr. Charles G. Lucas, Louisville, Ky.—Two things, to my mind, must be considered in peptic ulcer: first, the causative factor; and second, the question of chronicity. It is possible that peptic ulcer is merely the local manifestation of a systemic condition, as Dr. Abell suggested, but is it possible that we can examine these cases and determine the chronicity of the ulcer? I think Smithies, of Chicago, has proved by his research that many ulcers existing only a few weeks were hard and firm, while others dating back over many years were soft. Another thing, we get certain results following operation, primarily because of the operation, secondarily because of the rest. It has been extremely difficult in my work to get these patients to take sufficient rest and I venture to say that if statistics were prepared upon the number of weeks spent in bed by these patients at any previous time we might understand this better.

What influence do the general habits of life have on these ulcers? I have now under treatment an Englishman who has the history and clinical findings of ulcer dating back 15 years. He is now 37 years of age. His previous history gives several attacks of tonsillitis. At the time of the war he left Louisville and went into the English army. He served with it for four years, going "over the top" and living in the trenches during much of the time, but had no trouble. After his discharge he had some trouble again and has a fine collection of x-ray pictures from gastro-enterologists both in England and America. When I went over him thoroughly and suggested to him that the only sensible thing to do was to submit to an operation he refused very promptly, and that is often the case.

Now, what effects do we get from treatment? In the hands of a capable surgeon we get the best, of course; but the gastro-enterologist sees many cases that have had poor surgery and it is the poor surgery that gives us the bad impression.

I would like to correct something Dr. Abell said about his case of sleeve resection. I had seen the patient eleven years ago and he was operated upon six years ago. The results from operation were perfect but his habits could not be controlled. Every Saturday night he played poker and indulged in his favorite tipple, Tom and Jerry. Since his second operation, which showed the beautiful result of the first, he has been doing better.

I heard Dr. Trout's address and was much struck by the remark that after a patient was put in shape by the surgeon, his medical man should take care of him. I wish to endorse that heartily and I also wish to endorse the remarks of the essayist and the two who discussed it, about constant treatment following operation.

Dr. J. B. McElroy, Memphis, Tenn.—Uncomplicated ulcers I think should be subjected to medical treatment, and many of them will get well. Those which are complicated should be referred to the surgeon and the only quarrel I have with the surgeon now is that when these cases are referred to him it is thought this is all that is necessary to effect their cure. I find that after they have been operated upon there is often a great deal of complaint and a great deal that is lacking in the care of these conditions. The key-note of treatment as was so well expressed by Dr. Abell, is that uncomplicated ulcers should be submitted to medical treatment and those which are complicated should be subjected to surgery; and then these patients should be carefully supervised medically following operation.

Dr. Richard A. Barr, Nashville, Tenn.—I hate to introduce a discordant note into this discussion when it seems that the internists and surgeons are ready to make peace. With regard to the discussion as to when an ulcer becomes surgical it is only in the clinics that there is any

difficulty about a surgeon's deciding whether a case is surgical or not when it comes to him. If he is associated with an internist then he may see cases sufficiently early for there to be some chance for discussion. I have a surgical practice without any associate and when any case comes to me it is usually apparent that it is one for surgery. Mayo has said that an ulcer becomes surgical when it has had nine or ten complete medical cures. Judging from the discussion here we now have added to that a surgical cure and then the tenth or eleventh medical cure. At the Mayo Clinic they are building a kitchen to teach these patients how to cook and how to live after being operated upon. That is quoted from a statement by W. J. Mayo in the *Journal of the American Medical Association*, July 1, 1922. That is rather intricate and expensive and many people cannot live up to it. The proper procedure is for the surgeon to do enough surgery to cure his patient. It is true that these patients have often bled until they are so anemic that transfusion and medicine will not get them in shape for the complete operation you wish to do, and in such cases you may have to do two or three successive operations. Such multiple operations I believe are justifiable. However, I do not believe you can justifiably do an operation under ordinary conditions that carries only 70 or 80 per cent of cures, and then have the others come back for further surgery. It would be of great interest to know something about the etiology of ulcer. We have discussed etiology extensively this morning but very little is known about it. We always discuss it in great detail but we really know nothing about it except that ulcer of the stomach is usually associated with hyperacidity, and our effort in treatment is to try to lower that. We do know that there is some association between acidity and ulcer, and between these and the pyloric end of the stomach, and we know that if a pylorectomy is done we are not troubled further with peptic ulcer.

Our surgical effort should be to remove the ulcer and to try to prevent the formation of others, in the suture line or anywhere else. To cure an ulcer by surgery you have to resect it, that is if you are going to be sure to cure it. If you are going to prevent the development of other ulcers you have to do a pylorectomy, no matter where the ulcer actually present may be located. No matter what your opinion may be with regard to the "gastrin" theory you will admit that if you remove the pyloric end of the stomach you will not likely have further trouble from ulcer. Moynihan has done 118 partial gastrectomies for gastric ulcer with two deaths, and if he can reach that mortality others can. Nobody will dispute the benefit of partial gastrectomy. If the ulcer is located on the gastric side of the resected area you have to remove that in addition.

In ulcer of the duodenum you can resect or burn it out and so get rid of the ulcer itself. If you do a gastro-jejunostomy in addition you have a possibility of the formation of a jejunal ulcer either at the line of suture or lower down with of course a chance for recurrence of duodenal ulcer. If you do the Finney operation, gastroduodenostomy, you do not do anything for the patient that you can visualize unless you remove the ulcer. You do not do any good by enlarging the gastro-duodenal opening for the stomach empties too rapidly anyhow in the majority of instances. Those duodenal ulcers that sit up on the anterior wall and are easy to get at for resection do not come to me. They go to the clinics or at least do not come to me. It is recommended to resect duodenal ulcers where "feasible" but two-thirds of the ones I get hold of are not amenable to resection by Finney's method or any other, and in addition, this immovable ulcer is the very type that does the least good with simple gastro-jejunostomy. The value of the ordinary advice for the surgical treatment of ulcer fades into insignificance when you get the ulcers that come to me. I believe a partial gastrectomy is just as clearly indicated in duodenal ulcer as in gastric ulcer. You cannot always include the ulcer in the excised area but you get rid of that part of the stomach that breeds ulcer and you put the ulcer itself at complete rest so it is not troubled any further by muscular movement or acid secretion. You can do the Billroth No. 2 or the Moynihan procedure, as you choose, but for duodenal as well as gastric ulcer, I believe the only real treatment is partial gastrectomy.

Dr. Robert L. Sanders, Memphis, Tenn.—The proof of the pudding is in the eating and the proof of the method of operation is the way the patient gets along afterward. Nashville men are going strong on excision of the ulcer. Dr. Barr says certain types of ulcer come to him but in Memphis we see the ones in which we cannot afford to do pylorectomies if they are on the duodenal side. Often much edema is present and leakage may follow. One is liable also to encroach upon the common duct and other important structures. It seems entirely useless to do so much and to add an additional mortality percentage, when a simple gastroenterostomy will suffice and, in fact, be much better.

I wish to register myself as opposed to resections when the ulcer is duodenal. A gastroenterostomy, with or without enfolding the ulcer, will usually be effectual. Pyloroplasty may be used in selected cases. Dr. Horsley has given us something that is apparently an improvement on the old Heineke-Mikulicz operation. The outstanding feature of his modification is the extension of the incision further on the gastric side. His case reports are few but good. I am looking forward with much interest to the end results of his cases.

There is one type of case which has not been referred to at all this morning and that is the large ulcer on the lesser curvature near the cardiac end, referred to recently by Moynihan in his little book. We have seen a few cases and the handling of them has given us much concern.

In such ulcers situated there the infiltration and edema are so pronounced that sleeve resection or any type of operation is almost prohibitive from the standpoint of mortality. Moynihan has advocated leaving the ulcer alone, putting in a jejunostomy tube and feeding the patient for a certain time through this tube to permit the ulcer to undergo spontaneous healing. We have had such a case recently, where there was delay in emptying in the lower pouch, so we added a posterior gastro-jejunostomy to drain the lower pouch well, and then fed the patient through the tube. She has gained 15 pounds in weight, has taken nothing by mouth in 90 days, is perfectly comfortable and we feel she is going on to complete recovery. The internist has been disappointed in the treatment of this type of case and the surgeon has been disappointed also because the ulcer is inaccessible. Moynihan in his little book has stated that he has done three sleeve resections, that they all produced contracture and he condemns the procedure. Our experience has not been so bad but it has produced a contraction approaching an hour-glass in the third case of our series. It may be similar to the one mentioned by Dr. Abell and the patient may again be approaching the formation of ulcer at that point. At any rate, our sleeve resections have not been entirely satisfactory.

TENDON TRANSPLANTATION*

By Wyatt S. Roberts, M.D.,
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The purpose of this paper is not to outline in detail the technic of any one operation or to report any entirely new procedure, but to set forth a few salient points that have proved of actual worth to the writer in this particular field of surgery.

Since the introduction of subcutaneous tenotomy in 1831 there have been many operations devised upon tendons for the prevention and correction of deformities. Indeed, surgery of tendons has favorably kept pace with the rapid progress in other lines of surgery.

While admitting that some noteworthy advances were made in this work in the last half of the past century, we know that during the past twenty years more advantageous procedures were devised and more brilliant results obtained than in all the preceding years.

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Tendon transplantation finds its widest application and greatest usefulness in the residual paralyses of poliomyelitis, in the paralyses of traumatic origin, and to a less extent in spastic paralyses.

It would seem, from the immense volume of literature written on the various phases of the subject in recent years, that there would be little remaining to be said. Always a fascinating subject, full of promise and possibilities, tendon transplantation lends itself admirably to the experimental, creative mind of the surgeon with a mechanical tendency, but it is gradually reaching its level of efficiency and the future will witness more conservatism and the limitations will become more accurately defined.

Procedures of the most ingenious sort, which promised much at first, have been tried and for some reason or other have been found useless and been promptly discarded. Some, having enjoyed a short period of popularity and apparent usefulness, are gradually being abandoned and soon will be only of historical interest. Others, fortunately, have proved to be so practical in application and pleasing in results that they deserve to be and will be constantly used in correction of various paralytic deformities. While the field is open for the development of new ideas—and investigation should be encouraged—the writer feels that we should take stock of what we have, accept operations of proven worth and endeavor to improve the results of these by more judicious selection of cases, by more nearly perfect technic at operation, and by better after-treatment.

Tendon transplantation in the strict sense of the term means transference of the insertion of a tendon from one bony point to another. Tendon grafting, while very closely related to transplantation, means implantation of one tendon into another. Both procedures are intended to improve existing muscular function by restoring muscle balance.

To achieve the greatest possible success in this field of surgery one must be able intelligently to select cases favorable for transplantation. One must understand the basic principles involved and be able skilfully to execute them at the time of

operation. One must be in position to perform or closely supervise the after-treatment for a reasonable length of time. Many attempts to improve muscle balance have failed because one or more of the three above requisites did not obtain. A large number of failures could have been prevented had the surgeon realized beforehand that the muscle whose tendon was to be transplanted could not possibly perform the function of the paralyzed muscle because of its lack of strength. Other failures could have been avoided had the surgeon perfected himself in the intricacies of the procedure. Still other failures are credited, not as a result of an unfavorable subject, or lack of skill in execution, but to imperfect after-treatment. When one or more of these conditions exist, what might have been under different circumstances a brilliant success, pleasing to both the surgeon and patient, actually terminates in utter failure with its attendant disappointments.

It is generally conceded by orthopedic surgeons that the transplantations most likely to succeed are those at the knee, at the ankle and foot, and in the forearm and hand. Another accepted fact is that it is better to utilize, when possible, a muscle analogous in function to the muscle to be replaced; better still, a muscle with the same nerve supply. However, this is not absolutely necessary. A flexor to replace a flexor, an extensor for an extensor is desirable, but a flexor may be made to perform the function of an extensor and vice versa.

From the study of results in about 160 cases of tendon transplantations, the writer is convinced that the procedures which yield good results most consistently are the following:

Transplantation of the peroneus longus into the insertion of the anterior tibial in talipes valgus; transplantation of the tibialis anticus into the outer aspect of the dorsum of the foot in talipes varus; transplantation of the extensor communis digitorum and extensor longus hallucis into the dorsum of the foot in cases of moderate cavus with hyperextension of the toes; the peroneus longus and the flexor longus hallucis into the os calcis to reinforce the calf group, but not to replace these muscles when completely paralyzed; and transplantation of the biceps femoris and the sartorius or semitendinosus into the patella for weakness or paralysis of the quadriceps. In the forearm and hand there are many possibilities, but the one outstanding procedure is transplantation of the flexor carpi radialis, flexor carpi ulnaris, and pronator radii teres for the extensors of the wrist, thumb and fingers in radial paralysis. There are other single transplantations and combinations of transplantations which at times prove worth while and, indeed, a brilliant result may be obtained. The ones enumerated are, under favorable conditions, consistently dependable.

Before Operation.—A rather large number of ultimate failures can be attributed to errors of judgment before operation. It goes without saying that every surgeon who offers to do tendon surgery should have a thorough knowledge (actively working) of the anatomy, histology, and physiology of tendons and surrounding structures. The blood and nerve supply, the origin, insertion and direction of the muscles under consideration should be thoroughly known. The relative strength of the various muscle groups should be known. One should know fairly accurately the strength of a muscle to be transplanted and the strength in the normal state of the muscle to be replaced before the operation is begun, for it is manifestly a mistake to substitute a muscle of 5 pounds strength for one whose function is to lift 50 pounds. Again, where a muscle in normal health could easily perform the function of some other muscle, it might under other conditions as, after poliomyelitis, be utterly unable to perform the task. Generally speaking, a muscle of less than one-third the strength of the muscle to be replaced should not be transplanted, for with the loss of power which naturally follows the procedure itself plus the extra burden of performing a new function, it may result in complete loss of power. Unless the tendon to be transplanted has practically normal strength a special course of exercises and massage should be given as a preoperative measure to bring the muscle

to as nearly normal strength as possible. In cases where tendons of opposite function are to be used the patients should be taught to use those muscles well before operation, for then the task of re-education will not be so great.

To approximately determine the strength of various muscle groups and individual muscles a spring balance test was made on a group of normal children, ages ranging from 5 to 18 years. Each age was represented by 6 boys and 6 girls. The muscles of all four extremities were similarly examined and readings recorded. The maximum and minimum strength in pounds was noted and the average taken for each group of muscles at a given age. With this table one is enabled to ascertain at a glance the approximate strength of any group of muscles and compare them with the findings in the patient to be operated upon. Of course, this is not absolutely accurate, but it does serve as a valuable aid. The table shows in the following opposite groups that the normal average strength is: dorsi-flexors of foot to plantar flexors as one to three; adductors of foot to abductors as one to one; knee flexors to knee extensors as one to two; wrist flexors to wrist extensors as five to three; finger flexors to finger extensors as four to one, etc.

With this knowledge it is easy to understand why transplantation of the biceps femoris alone for a paralyzed quadriceps is not likely functionally to succeed, for normally the combined strength of the knee flexors is only one-half the strength of the quadriceps and, granting that the biceps represents one-third the power of the flexor group, we have a muscle trying to perform the function of a muscle six times its strength. In theory it would not, and in practice it does not, succeed. This same line of reasoning can be carried further and serves to explain the futility of expecting the flexor longus hallucis and one of the peroneals to perform the function of the paralyzed calf group. However, when used to reinforce only weakened muscles of this group, they may be expected to work to much advantage.

All obstructing deformities should be completely removed before the tendon is transplanted.

In paralyses following poliomyelitis transplantations should not, ordinarily, be done until at least two years have elapsed since the acute illness and not then unless the patient has reached the age of six years.

In traumatic paralyses it is necessary to wait only long enough to be assured that regeneration of the nerves will not likely take place.

In spastic paralyses only in the cases that show sufficient mentality to cooperate effectively should any transplantation be performed.

At Time of Operation.—Every surgeon has his own choice method of preparing the operative field, but as a rule it is considered sound practice to shave, scrub, sterilize and apply sterile dressings the day before. Resterilization just before the operation is begun. An Esmarch bandage with a tourniquet greatly facilitates matters and when properly applied may be considered safe if the operation does not last for much more than an hour. The ends of the toes if the operative field extend to the foot and the ends of the fingers if at the hand, should be completely and continuously barred from the operation until the final dressings are applied. Until the last skin suture is tied, the most refined technic with regard to asepsis must be followed by every one engaged in the operation. Sutures, needles and tissues should be touched only with the business end of the instruments. Suture material and the tendon should be carefully protected from the skin by use of towels or gauze. The steps of the operation should be so executed that the tendon shall receive a minimum of trauma and be exposed to the air the shortest time possible. This may be accomplished first by preparing the site for the new insertion, followed next by exposing and opening the upper end of the old sheath where the new tendon is to be brought into line with the original tendon, then passing of the threaded tendon carrier through the sheath down to the site prepared for insertion. This remains until the new tendon is detached, dissected up to the required point, the anchoring sutures placed through the tendon, and then brought and attached to the carrier which

is then used to pull the tendon through the sheath. The incision exposing the transplanted muscle should be closed, but first suturing the split sheath, paying close attention to ligation of vessels. The insertion is then completed, all incisions closed, and dressings applied.

Wherever possible, and it is usually possible with tendons at the ankle and wrist, the transplanted tendon should pass through the entire length of the old tendon sheath. The process of transferring the sheath with its tendon is more complicated, produces more trauma, and does not furnish any better gliding medium than the old sheath. In tendons where the sheath method is not feasible, as in transplantation of the hamstrings for the quadriceps, a spacious subcutaneous channel should be made. All rough surfaces of bone, periosteum, or fascia which come into intimate contact with the tendon or its muscle should be securely covered with a suitable fat pad. This minimizes the danger of troublesome adhesions which develop very rapidly and which tend to lessen the force of the muscle pull, if indeed they do not destroy all chances for success.

The integrity of the insertion of a tendon must be beyond question, for if the insertion is not stable the operation is a failure. Since it is impossible to reproduce exactly the original insertion, the next best method is implantation into bone and not into the coverings of the bone. By this is meant, a hole is chiseled out of the bone to the depth of one centimeter where there is plenty of substance and into the medullary canal in the small long bones of the hand and foot, the tendon end drawn down to the bottom and firmly held by passing the anchoring sutures from within out and back where they are tied. The small flap of bone and its periosteum are then sutured into place, followed by closure of the soft parts. The tension of the transplanted tendon is of importance. At the foot, for example, with moderate, not extreme over-correction the tendon should be left under slight strain so that when over-correction is carried a few degrees further the tendon is somewhat relaxed. This position should be held until the plaster cast is strong enough not to yield. The course of the tendon from its muscle to its insertion must run as nearly straight as possible. It is usually a wiser procedure to sacrifice a few of the lower muscle fibers by detaching them from their origin than to angulate the tendon acutely in its course.

In a large proportion of cases it is rarely necessary to use heavier anchoring sutures than No. 2 chromic cat gut (thirty day). Where this is considered not strong enough, medium kangaroo tendon may be employed.

After the Operation.—The importance of correct after-care of these cases cannot be too thoroughly emphasized. Within the first twenty-four hours immediately following the operation, the top of the cast should be removed, the bandages and cotton slit from top to bottom, making sure that all constricting threads are severed, and then the top replaced and bandaged. This not only adds to the comfort of the patient, but materially minimizes the likelihood of adhesions.

At the foot and the knee active exercises should be started the fourteenth day, while at the hand ten days is long enough to wait. These exercises should be very mild and continued for only a few minutes each day, but gradually increasing. Baking should be employed for ten minutes in connection with the exercises. The position of the member should not be disturbed for from three to four weeks, at which time it may be removed entirely from the cast and the treatment continued, but always protecting the tendon insertion against gravity. For the following two weeks the cast should be replaced after each treatment. Some supporting apparatus should ordinarily be worn for from eight to twelve months after operations at the knee and ankle. At the wrist and hand it is hardly ever necessary to wear supporting splints for longer than four months.

CONCLUSIONS

Tendon transplantation was a brilliant contribution to the surgery of paralytic deformities.

lier years has given way to conservatism.

Much of the experimentation of the ear-

Procedures of known worth should, as a rule, be employed and perfected by more careful selection of cases, by improvement of the operative technic, and by more thoroughly supervised after-treatment.

The better these points are remembered and practiced in each case, the less chance for needlessly inflicting our patients and casting opprobrium upon ourselves and the profession.

DISCUSSION

Dr. G. E. Bennett, Baltimore, Md.—Dr. Roberts said that he thinks one should wait about two years after the acute stage of poliomyelitis before attempting tendon transplantation. Of course, that is only an opinion. My personal opinion is that two years is too short a time. If one is going to do any really constructive work in poliomyelitis, postponing it a little longer means nothing, and not infrequently one finds that tendon and muscle power does come back after that time. I remember that I had a most disastrous experience with a little child that came to me some fourteen years ago with very marked valgus deformity. It was not the tendon I transplanted that produced the tendon deformity, but the tibialis posterior came back to power and produced the deformity with the peroneal I had transplanted.

I tell my students not to do any operative procedures to balance up muscle power until five years have elapsed. Of course, one can do operative procedures to correct deformity, such as lengthening tendons, but I am rather confirmed in my opinion that one should wait a good long time before transplanting tendons.

There is another thing which came up, and that is that the power of the tendon transplanted is never equal to that of the original. I believe that when you put with your tendon transplantation some other opposite procedure the tendon does not have quite so much to do. Then you do not have to have a muscle that will perform its full function, but if it does even 30 or 50 per cent of what it should do, the other operation will assist you. If the transplanted tendon will do 50 per cent, we can add the other 50 per cent by some other structural operation.

It has always seemed to me rather amusing that a man will be so very careful in taking a peroneal tendon out of its sheath and opening up the sheath of the tibialis anticus and passing it down through the sheath. Why in the world, instead of putting it in, does he not take out the dead tibialis anticus and send it down through the sheath, and not have both tendons in the sheath, which is large enough only for one? I would like very much to hear what the others think about it.

Dr. A. G. Nichol, Nashville, Tenn.—Reasonable knowledge of muscle mechanics is necessary, of course, in all tendon work. It is very unreasonable to assume that one can transplant a weak muscle to do the work of a strong muscle. In practically all instances the muscle transplanted is not so strong as the one for which it is being substituted, and, therefore, one will get a certain amount of overstrain and overwork, and in small tendons one will not secure the result expected. The best results are obtained about the ankle.

In the North and East they see quite a lot of poliomyelitis, but not so much in this section. We have not had the wider experience that those men have had. The basic principle is having a reasonable knowledge of what we are trying to do, and in orthopedics it applies more than in anything else, never to do anything without sufficient reason for it. It will apply as clearly in orthopedics as in any other branch of medicine.

Dr. Lawson Thornton, Atlanta, Ga.—In cases of paralytic feet, we think of the remaining muscle power as much in terms of a deformity as of the ability to maintain function and normal architecture.

First, we plan to produce a stable foot with normal architecture and then place the tendons where they will be of greatest service. Dr. Michael Hoke's foot stabilization operation gives a stable foot with normal architecture.

Some prefer to consider tendon transplantation of paramount importance in infantile paralytic feet. But, if the foot stabilizing operation be also done, the success of tendon transplantation is assured.

Dr. R. W. Billington, Nashville, Tenn.—The supplementing of tendon transplantation with other procedures, in order to obtain stability, is something that is necessary if one wishes to get permanent results in transplantation about the ankle, because one remembers that the foot is none too strong in the normal individual. When there is a condition that justifies a tendon transplantation, there is a weakening of the musculature, and we shall further weaken it by the tendon transplantation. So we should stop and consider what is the best means of obtaining stability, whether we have to sacrifice movement to get stability, and what movements we can best afford to sacrifice. That means, of course, that lateral movement of the foot is the least essential, and that is the one we shall have to sacrifice to get stability and use what power we have to get flexion and extension.

The upper extremity is quite different, because we have no problem of stability to consider so far as weight bearing is concerned. Before my experience in the war, and seeing and doing quite a bit of this work on the upper extremity, I was very skeptical and was surprised to see the good results that were being obtained when we went across. I saw some of the early cases they did at Liverpool, particularly by Sir Robert Jones and Major McMurray. In paralysis of the radial nerve we can, by two or three operations that were devised then, get perfectly remarkable results. In median and ulnar paralysis the results are somewhat less satisfactory.

If we make up our minds, in dealing with the lower extremities, that we must obtain stability first of all, and that we can get that stability by doing an astragalectomy or subastragaloid arthrodesis, we can get very satisfactorily functioning limbs.

Dr. Fred G. Hodgson, Atlanta, Ga.—There is one point which I think has not been sufficiently emphasized in doing reconstruction work and industrial work upon the tendons of the hands and fingers. I have seen some very disappointing work in reconstruction of the tendons of the hands, especially in cases with stiff joints that were not mobilized before the tendon operation was performed. We find the joints of the finger very stiff and difficult to move, especially where a long splint has been used. It is very important to use massage and thoroughly mobilize stiff joints before expecting a transplanted tendon to do its work. I think we could prevent many adhesions and much scar tissue which make these operations necessary by proper incisions, especially in infected hands or large palmar abscesses. The very excellent work of Kanavel on this subject, the infections of the hand, is well worth study. The splints should not be kept on long enough to make stiff joints. It has been my rule to use few splints or none at all, and to start early motion and massage, even before the wounds are healed.

Dr. E. G. Brackett, Boston, Mass.—The subject of tendon transplantation has always been interesting and one strewn with more failures and disappointments than almost any other procedure in surgery, due, I think, many times to lack of caution in the things to which Dr. Roberts has called our attention, and also to the lack of proper care in the selection of cases and the lack of after-care.

The selection of the proper case for operation and the age for operation are two of the most important considerations in this subject. I believe that those who have been doing this operation for a long time have learned from experience to postpone the date of operation to the older periods. Personally, I believe that whenever possible we should avoid performing tendon transplantation until the child has obtained its growth, for the reason that during growth, with the unequal pull which must be left in any paralyzed foot, we have already a tendency for the recurrence of deformity, or the development of a new one. On the other hand, if we wait until growth is obtained, and this element is eliminated, we have then a much larger possibility for success. One can almost make a rule that if deformity can be prevented or held we should treat conservatively until the time when we think the patient has obtained his growth in order to get this permanent result. This does not mean that sometimes operations must not be done in the earlier periods, but we must recognize that failure often comes from operation at too early a period, and the failure is due to this rather than the failure of the operation to obtain the object desired.

Another very important caution is that we should not feel that the operation finishes the treatment. This has also been a cause of failure many times in operations which themselves have been successfully performed, but by those who have not recognized this important element in all orthopedic work. So often the treatment in orthopedic work can be considered as beginning when the operation ends. We must realize that a case needs after-care and after-treatment fully as much as in the post-operative stage, and that as much as this is recognized, one may expect a larger measure of success.

Dr. Roberts (closing.)—The province of the paper was simply tendon transplantation, and not other procedures, which we know are important. But I could not cover all that, and I wanted to adhere especially to selection of cases, tendon transplantation, and after-care. We all know that other operations have to be done, and I tried to sum it all up in one sentence by saying that all obstructions should be removed, including the correction of deformities.

I said that at least two years should elapse before the operation in infantile paralysis. As a rule, I do not think two years is sufficient, but at least two years should go by.

The end-results and their failures prompted me to write this paper. The causes of failure, in most of them, can be attributed to these three things: poor selection of cases, poor operative technic, and poor after-treatment, that is, not carried over a long enough period of time.

One thing I want to mention that Dr. Bennett brought out regarding the placing of the transplanted tendon in the sheath with the original tendon. If you feel that the tendon will never recover, then it is much easier to remove it rather than try to get the new tendon through with the old one. I believe that unless a tendon has a chance to come back it should be removed.

X-RAY VS. RADIUM IN THE TREATMENT OF UTERINE HEMORRHAGE*

By Jackson W. Landham, M.D.,
Atlanta, Ga.

The term uterine hemorrhage without qualifications would necessarily apply to any pathological condition of the uterus characterized by the presence of hemorrhage, but it is the purpose of this article to limit its application to uterine fibroids and myopathic bleeding. Purely operative treatment in these conditions should be strongly condemned, as the dangers from embolus, narcosis, infection, shock, hem-

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orrhage, or secondary injury cannot, even with present-day technic, be entirely excluded.[1] The primary mortality due to radiotherapy is practically nil.

Myopathic bleeding from the uterus represents a condition the manifestations of which may indicate multiple pathology which is variously termed hemorrhagic endomtritis, chronic metritis, subinvolution of the uterus and uterine arteriosclerosis.

Radiotherapy accomplishes a cure in these conditions by direct action on the individual cells by producing an endarteritis resulting from the action on the endothelial cells of the blood vessels and lymphatics, and by the destructive effect that it has on the Graafian follicles of the ovaries.

There is no other class of patients in whom the diagnosis should be so well determined as the class of patients considered in this paper. In uterine fibroids we should know whether they are single, multiple, submucous, intramural, subserous, pedunculated or calcareous. In myopathic bleeding we must rule out the presence of malignancy, cervical and uterine polypi, inflammatory diseases of the adnexa, lacerations, uterine displacements and extra-uterine pregnancy. Cases that do not respond satisfactorily should always arouse a suspicion that the original diagnosis of a benign metrophathy may be erroneous. A preliminary curettage for diagnostic purposes is an essential part of the examination in cases where the pelvic examination does not establish the diagnosis.

In the selection of cases for radiotherapy we should consider age, sexual functions, type of tumor and complications. Radiation is not absolutely contraindicated in young and middle aged women except in cases where the sexual function has not been established or where there is a desire for children. Multiple fibroids requiring surgical removal of the uterus are proper cases for radiotherapy. Women who have undeveloped sexual functions should be treated surgically. [3]Pedunculated fibroids are surgical on account of the danger of degenerative changes due to torsion of the pedicle and the ease with which they are removed surgically without removal of the uterus. All patients who have active tuberculosis, heart or kidney lesions, or who have lost blood to the extent that there is grave secondary anemia present should be treated by radiotherapy. In considering the contraindications to radiotherapy in uterine hemorrhage, we should realize that if it be necessary to produce a premature menopause this will be much better tolerated by the patient than a menopause resulting from oophorectomy.[4] We must also consider the fact that fibroids and myopathic bleeding may frequently be cured by radiotherapy without producing the menopause or destruction of the internal secretion of the ovaries. Absolute contraindications to radiotherapy are necrosis, cystic or calcareous degeneration, large adherent fibroids producing pressure symptoms demanding immediate relief, pelvic inflammations, pedunculated tumors and malignant complications of the body of the uterus. Malignancies of the cervex uteri show a higher percentage of cures when radiotherapy is employed than they do when treated surgically.

A comparison of results obtained by Roman Schmidst with radio-active substances and roentgenotherapy in uterine fibroids and myopathic bleeding shows that out of a total of 2441 cases treated clinical cure was obtained in 2359 patients (96.62 per cent). Roentgenotherapy produced a clinical cure in 1.6 per cent more cases than did treatment with radioactive substances.[5] Of a total of 3748 myomas treated by both methods together, clinical cure was obtained in 3417 cases (91.08 per cent). Irradiation with radio-active substances gave 2.9 per cent more clinical cures than did roentgenotherapy. Considering apparent cure, disappearance of tumor and the attainment of amenorrhea, irradiation with radio-active substances gives better results than roentgenotherapy. The latter, however, is to be preferred in view of the recurrences, improvements, refractory cases, deaths and clinical cures.

Since there is a direct effect upon the individual cells, and an endarteritis in addition to the effect on the Graafian follicles, it is possible in roentgenotherapy to protect the ovaries and treat over the uterus to correct the hemorrhage. Many

cases managed in this way have responded very satisfactorily. However, we cannot be certain that an artificial menopause will not result, due to scattered radiation reaching the ovaries. When radium is used in the treatment of these conditions there is nothing to protect the ovaries except distance from the point of application and the limit of the period of treatment. Frequently there develops a very irritating leucorrhea following the intrauterine application of radium which does not follow roentgenotherapy. Many patients who are referred to us for radiotherapy to control myopathic bleeding have had a diagnostic curettage and they are not willing to take an anesthetic and be hospitalized to be treated with radium. This is not necessary in x-ray therapy.

The technic to be followed in these cases varies, depending upon whether it is desired to accomplish a permanent menopause or to endeavor to carry the treatment to a point that will control the hemorrhage without destroying the function of ovulation.

If a permanent menopause is desired, the anterior and posterior surfaces of the pelvis are divided into four areas, two anterior and two posterior. These areas are treated for ten minutes each, using four millimeters of aluminum as filters, ten-inch skin target distance, five milliamperes of current and a nine-inch spark gap. Separate sittings are used for the anterior and posterior surfaces in order to prevent nausea and vomiting. Two such treatments are given at intervals of three weeks. The patient is then instructed to go for two months without treatment so that a sufficient time will have elapsed to determine the results of treatment. This plan of treatment would not be satisfactory in a patient who was losing blood rapidly, but in other cases it accomplishes the menopause so gradually that there are no disagreeable symptoms. If it is thought undesirable to produce a permanent menopause the ovaries should be protected by lead and the radiation directed over the uterus. In the use of radium in the management of these cases we have to depend upon regulating the dose by the number of milligram hours, thereby giving a partial or total treatment to all structures involved.

CONCLUSIONS

(1) Surgical treatment of uterine fibroids and myopathic bleeding is indicated in a very limited number of cases.

(2) An accurate diagnosis which may demand a preliminary curettage is essential.

(3) Since uterine hemorrhage may be controlled without producing a permanent menopause, age does not necessarily constitute a contraindication to radiotherapy. Women with undeveloped sexual functions, pelvic inflammations, cervical or uterine polypi, pedunculated or degenerating fibroids, malignancy of the body of the uterus or large adherent fibroids producing pressure symptoms, should be treated surgically.

(4) Statistics and my personal experience with x-ray and radium convince me that roentgenotherapy is the method of choice in the management of these cases except in patients who have marked hemorrhage. These should be treated with x-ray and radium so that a quick result may be obtained.

(5) Technic suggested contemplates a gradual menopause so that unpleasant symptoms characteristic of this period may be prevented as much as possible.

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DISCUSSION

Dr. E. C. Samuel, New Orleans, La.—In our clinic at the Tuoro Infirmary we have had occasion to make use of both radium and x-ray probably about equally. Up to the time that we obtained our first radium, about six years ago, we were using x-ray exclusively for the control of myomas. Since the purchase of radium we have made use of the radium in practically all of our cases up to within two weeks ago when we installed a new deep therapy apparatus, when we started again in selected cases to use the x-ray.

Dr. Landham spoke about the contraindications of pelvic inflammations complicating fibroids in the use of the x-ray. We have disregarded this entirely and do not hesitate now to use x-ray in the presence of pelvic inflammations in patients who require therapy for the removal of the fibroid.

It is disappointing at times to radiate a patient as thoroughly as it is possible to radiate with deep x-ray and radium, using one or the other, not completely to relieve the symptoms in so far as the cessation of hemorrhage is concerned, and to have the patient return in three or four months with practically no reduction in the size of the fibroid. Just what this is due to we do not know. In patients who were given a comparatively small quantity of radium and x-ray one may see a complete disappearance of the fibroid with cessation of the hemorrhage, the pressure symptoms and the whole train that goes with it.

One of the objections to the use of this newer 200,000 volt technic is in the possibility of the liberation of some toxic substance, which we do not at present understand, into the blood stream. There has been quite recently in some of the German journals reports of considerable trouble after massive radiation of fibroids. Up to the present we have had no trouble in that direction because we have not given the one big dose at one sitting, dividing it rather into four sittings on four different days. Up to now we have seen no evidence of roentgen sickness and the other conditions that this article called attention to.

I believe that in active bleedings radium still holds the leading place in therapy of fibroids.

The Doctor spoke of the patient's refusing to take a second anesthetic for the putting in of the radium after a diagnostic curettage. In our Infirmary at the time the diagnostic curettage is made the pathologist makes a rush diagnosis, the radium is put in, and there is no necessity for a second anesthetic. The usual technic that we have followed in the use of radium to radiate these fibroids is to insert 50 mg. in a tube made of celluloid, using two 25 mg. tubes instead of one. We place them in the uterus, leaving them in for 24 hours and in most cases we usually get a cessation of the hemorrhage and a diminution in the size of the tumor. Rarely do we have to put in a second or third application. If we have to give a second application we usually do not give an anesthetic. The patient is brought to the hospital the night before and gradually dilated with Hagar dilators.

Dr. W. P. Whittington, Asheville, N. C.—I have had no extensive experience with radium but I have had considerable experience with the x-ray. I have yet to find any failure or dissatisfaction from its use in cases of hemorrhage from any cause. Of course, a great deal depends upon the technic of administration. Hemorrhage at the menopause or from a congested uterus in younger women, may be controlled with a mild dose from a nine-inch spark gap without producing any damage to the skin. One or two doses are usually enough to cure the women permanently. In younger women the menses will return in two or three months and the patients will by that time have regained their active health.

There is one point that is generally emphasized by men who have had experience in the treatment of hemorrhages from the uterus, that is regarding the use of the x-ray in non-operative cases. If we have a case of cancer of the cervix with hemorrhage that is past the stage of radical operation, what better can we do than to give x-ray treatment? It will check the hemorrhage, relieve the pain and may cure the condition, which is better than anything we can do in surgery. Therefore, I do not object to giving my non-operative cases of hemorrhage just as deep doses as I can without producing injury. I have come to the conclusion that no advanced case of malignancy is operable. I think the time will soon come when surgery will throw up its hands and leave the treatment of these cases to x-ray or radium. Surgeons and roentgenologists will go hand in hand in cases where surgery is impossible. The day will come when even radium will be superseded by proper methods in x-ray in cancer.

We give the treatment over the liver and over the abdomen, in addition to the pelvic treatment. Treating malignancies with x-ray is not so difficult as some people think.

Dr. George E. Adkins, Jackson, Miss.—May I suggest that in each discussion where reference is made to the dosage, the man indicate what he is giving.

Dr. Whittington.—I have a machine that gives only a ten-inch spark gap. In fibroids and cancer of the uterus I use a 9½ inch gap with 10 to 14 inch distance according to the thickness of the abdominal wall, 5 ma, 5 to 6 minutes with 3 millimeters of aluminum. I always use the crossfire method to avoid injury to the skin. I usually use three ports in front and three in the rear, and one directly to the cervix through a vaginal speculum. In order to do this I fasten foot straps by snaps to a rope passed through a ring bolted to the wall. This contrivance holds the feet up out of the way of the connecting tube cords, and the tube can be placed as near the cervix as desired, and the treatment given directly on the diseased cervix.

Dr. D. Y. Keith, Louisville, Ky.—Two years ago when the Southern Medical Association met in Louisville, I learned a great lesson from Dr. E. C. Samuel of New Orleans. He saw a patient in my office who had a large uterine fibroid. She was given x-ray over the larger tumors. She had one under the costal cartilage on the left side the size of a fetal head, one on the right side that filled practically the entire abdomen, and the pelvis was entirely filled. She was given x-ray over each of the larger tumors anteriorly and three portals posteriorly. She was also given radium. This was the second or third case of uterine fibroid that we had treated with radium and we tried to carry out the advice we got from Dr. Samuel. Since that time we have been using radium inside the uterus and x-ray exter-

nally on all large fibroids. I am sure the patients receive more benefit in large fibroids from both x-ray and radium than from either singly.

We believe that we get better results in our fibroids using four millimeters filtration, five milliamperes, nine-inch sphere gap, and the time varies entirely with the size of the tumor.

The other point that I want to speak of is regarding anesthesia. It is the rarest thing in the world that we use anesthesia for putting radium in the uterus.

In a girl of fifteen years, you have to use it because she has pain in the vagina on dilation. If you take a sharp-tooth forceps they cannot tell when you catch hold of the cervix. We demonstrated that last year in the sister of a surgeon who had had a double pneumonia, a heart lesion and a kidney lesion. He said he was sure we could not use the radium without an anesthesia. We tried it without and she had no discomfort. She has received a cure from the radium without an anesthesia's ever being administered. If you are gentle enough in your manipulations the patients will not notice the insertion of the radium. In the cases in which we are to do a curettement we usually give an eighth or a sixth of morphine beforehand.

Another thing that Dr. Samuel brought out then that was interesting to us was the point we have been trying to make in the diagnosis of fibroid cases, that is the character of the fibroid by feeling. If you have a soft fibroid it yields very readily to treatment. If you have a very hard uterus with nodular fibroids these go down very slowly and many do not completely disappear.

Dr. L. B. McBrayer, Sanatorium, N. C.—At the North Carolina Sanitarium for the treatment of tuberculosis we have adopted the policy that it is our business to relieve the patient of any disease or condition that is in any way interfering with the patient's recovery from tuberculosis regardless of what it is. We do not wait for these uterine hemorrhages to produce an anemia and it seems to me that the essayist was probably in error, if I understood him correctly, in making a suggestion of that kind. Every persistent menorrhagia or metrorrhagia in our patients is treated with x-ray very satisfactorily. We have a patient in the sanitarium now who had a persistent nonmalignant hemorrhage from the uterus who had as many as four or five curettages by different surgeons. She was finally treated by Dr. Kelly of Baltimore with radium in sufficient quantity to produce the menopause. By giving small doses of x-ray and relieving the menorrhagia and metrorrhagia we do not induce the menopause, except in an older patient.

Dr. Landham (closing).—There is a considerable difference in hospital as compared with office management of patients. Anesthesia, which is often necessary in the intra-uterine application of radium, can be carried out easily in the hospital, but not with the same degree of safety in the home or at your office.

As a general proposition frozen section examination of uterine curettings is very unreliable. I am associated with a pathologist who attaches no importance to a diagnosis made from a frozen section examination of uterine curettings. It is better to imbed the curettings instead of attempting to make a diagnosis from a frozen section examination. This would necessitate a delay of several days in the application of the radium and if an anesthetic should be applied the patient would have to go through with this a second time.

I stated in my paper that malignancies of the body of the uterus were primarily surgical. This is due to the fact that malignancies of the body of the uterus are rather slow to metastasize and it is better to do a surgical removal of the uterus in the form of a sub-total hysterectomy than it is to depend upon radiation therapy. On the other hand, cancers of the cervix are primarily cases for radio-therapy because the results are better where efficient treatment with radium and x-ray is given.

I have not found it easy to apply radium in the uterine cavity without an anesthetic. I have applied it without an anesthetic in women who have borne children, but it is not a very easy thing to do, especially where your radium is well filtered to prevent the irritating leucorrhea that follows the intra-uterine application of improperly filtered radium. Of course, you can take the tubular form of applicator and apply it in the cervical canal with ease if you do not filter.

EYE, EAR, NOSE AND THROAT

VACCINE TREATMENT OF VERNAL CONJUNCTIVITIS*

BY JOHN F. TOWNSEND, M.D.,
Charleston, S. C.

The nature and mechanism of the symptom group known as vernal conjunctivitis is still obscure. Text books add little to our real knowledge of this condition. But a diligent reading of all the literature upon it and allied subjects seems to throw some light upon it.

Fuch in his text book of "Ophthalmology" gives little on the etiology except the seasonal exciting factor; but why under similar seasonal conditions some people develop vernal conjunctivitis and some do not, he does not even try to explain.

(1) Whether they do or do not develop it depends, I believe, upon whether or not they have an anaphylactic sensitization to the antigens of vernal conjunctivitis. I believe vernal conjunctivitis is an anaphylactic reaction similar to that of hay fever, asthma, and sometimes to some types of urticaria and eczema.

(a) That asthma, hay fever, etc., are anaphylactic conditions, can easily be proven.

Dr. Lathan and Dr. Coke, in an article on "Sensitization in 270 Cases of Asthma," in the *Practitioner*, August, 1922, says that

"It is now established that there is a close analogy between experimental anaphylaxis and hay fever, asthma, urticaria and other similar complaints."

Dr. C. W. Hollopeter, in his book on "Hay Fever, Its Prevention and Cure," April, 1922, says that

"The anaphylaxis theory to explain the phenomena of hay fever and asthma is accepted by a majority of investigators."

Frank Coke, in "Asthma and Anaphylaxis" (*British Medical Journal*, March 21, 1921), says that

"Asthma, hay fever, urticaria, eczema, migrain, etc., have many common traits and will probably be proved eventually to be symptoms of anaphylaxis and not separate diseases at all."

Francis M. Racheman, in "The Mechanism of Hay Fever," in *Archives of Internal Medicine*, August 15, 1922, says that

"The hay fever mechanism is worthy of careful study for the reason that it is quite typical of a group of clinical symptoms presumably due to a natural sensitiveness to some foreign protein."

(b) As hay fever and asthma, etc., are anaphylactic conditions, they can be produced by the proper antigen at any season of the year.

That an anaphylactic reaction can be excited in a susceptible person by the injection of the exciting antigen is a principle suggested by Elliotson as long ago as 1831 (and agreed to by Phoebus, who quotes experiments made by Kirkman in "Der typische Fruhsommer-Katarrh," p. 137). This is agreed to by Coke (*British Medical Journal*, March 21, 1921); also by Scheppegrell (April, 1922); H. K. Detweiler and C. W. Hollopeter (April, 1922). This anaphylactic reaction can occur even in mid-winter. Furthermore, C. W. Hollopeter says in this connection that

"The hay fever condition passes to the asthma condition, which each year becomes earlier, finally becoming perennial, the attacks occurring at all seasons, without reference to the presence of pollen in the air."

Scheppegrell, April, 1922, says that

"Immunity is frequently relative. A patient may live many years with no attack until overwhelmed by some exposure. Then even if he lives in the same place where he was heretofore immune he develops the disease yearly."

I have found vernal conjunctivitis also to occur at any season, and am now treating a case which has had vernal conjunctivitis more or less constantly during all the seasons, having started in the fall about three years ago. This case had marked circumcorneal heaping, which is becoming less marked under the influence of vaccine injections. The itching disappeared in this case very promptly.

(c) There is an association between vernal conjunctivitis and other anaphylactic conditions.

De Schweinitz, in his book on "Vernal Conjunctivitis," says: "It may accompany the disease known as hay fever." In a case of hay fever that I recently saw, the vernal conjunctivitis symptoms were

*Read in Section on Eye, Ear, Nose and Throat, Southern Medical Association, Sixteenth Annual Meeting, Chattanooga, Tenn., Nov. 13-16, 1922.

typical. This case was relieved by vaccine injections. Dr. Cord, in speaking of afenil for vernal conjunctivitis, in part says:

"The mode of action of afenil is not very well understood, but it has been effective in vernal conjunctivitis, bronchial asthma, urticaria, and the prevention of anaphylaxis and hay fever."

He thus classifies vernal conjunctivitis with these other conditions. The more I have read on this subject the more I find a similarity between vernal conjunctivitis and anaphylactic conditions.

H. H. Dale (in "Specific Sensitiveness and Anaphylaxis," *British Medical Journal*, January 14, 1922) says that

"The anaphylactic shock is manifested in various ways in the different animals. In the dog it is gastro-intestinal, in the rabbit it is cardiac, in the guinea pig it is bronchial and in man, a more complex animal, it is still different. But in all there is this similarity that in each there is an eosinophilia."

In vernal conjunctivitis there is also an eosinophilia. Drs. Lathan and Coke say that "In anaphylaxis there is a definite eosinophilia." Brown Pusey (*Jour. A. M. A.*, 1911, LV ii, 1207), in an article on "Eosinophile Cells and Pollen in Vernal Catarrh," says:

"In April, 1911, I reported a finding of eosinophile polymorphonuclear leucocytes in smears taken from a series of cases of vernal catarrh confirming Herbert's discovery. Interested in this finding and knowing the many points of similarity between vernal catarrh and conjunctivitis of hay fever, I have been led to the examination of smears taken from a series of cases of the conjunctivitis of hay fever, where I found eosinophile polymorphonuclear leucocytes in great abundance. Indeed, the cellular content of a smear from one disease is the same as that from the other. This observation shows another, and possibly very important, similarity between the two diseases. We know that the conjunctivitis of hay fever is due to pollen. From observation of eosinophile cells in the conjunctival secretion of hay fever, we know that pollen may cause an inflammation of the conjunctiva, with secretion containing an abundance of eosinophile cells. This fact becomes of increased interest when it is realized that eosinophile cells are negligible factors, as is shown by my previous work in smears taken from all ordinary forms of conjunctivitis. It is in the field of the etiology of vernal catarrh (an unknown field) that the finding of these cells in hay fever is of interest. I venture to think that the presence of eosinophile cells in the conjunctivitis of hay fever and in vernal catarrh and their absence in ordinary forms of conjunctivitis points strongly to a similar etiological factor—pollen."

(Also see Hollopeter in "Hay Fever, Its Prevention and Cure," and Scheppegrell in "Hay Fever and Asthma.")

Conversely, we find that a non-specific protein shock as from typhoid vaccine differs from that of anaphylaxis by the absence of eosinophiles, which are always present in anaphylaxis, an additional proof that vernal conjunctivitis is an anaphylactic shock. There is also quite a similarity between the secretion of vernal conjunctivitis if examined microscopically and otherwise and that of asthma.[3] [4]

Berkhart, 1886, said: "Vernal conjunctivitis secretion is similar to that of asthma."

Summing up their opinions, they seem to be as follows: there is a similar and peculiar chemistry of the secretion of vernal conjunctivitis and of asthma, which peculiarity causes in asthma the twisted threads covered with mucin and sago-like globules of eosinophile cells, also twisted around it (Curschman's spirals) (Berkhart, page 48), and in vernal conjunctivitis there is a thread of similar constitution. In one case the twisted thread is due to the peculiar spiral arrangement of the finer bronchioles, which with respiration seems to cause the twisting into filaments of the special secretion present (Babcock quotes Hoffman). In vernal conjunctivitis, a similar thread-like or stringy formation, is produced by the action of the eyelids on a similar form of ocular secretion. A more brittle form of discharge would produce a foam in asthma and just a discharge in vernal conjunctivitis. The point is that there is a similarity, microscopically and macroscopically, between the discharge of vernal conjunctivitis and of that of asthma and hay fever.

In the vernal conjunctivitis of many negroes the appearance was similar to that described by Dunbar Roy (SOUTHERN MEDICAL JOURNAL, 1915; abst. *Am. J. of Ophthalmology*, April, 1916), "At the limbus there is an elevated circular and gelatinous mass, which is occasionally pigmented, to which Dr. Jackson agrees in the *Am. J. of Ophthal.*, April, 1918. I have found that the vaccines, in addition to relieving the itching, also diminish the pigmentation and hyperplasia.

I think H. H. Dale and C. H. Kellaway in "The Philosophical Transactions," Royal Society of London (series B. V. ii, pages 273-315—I am not sure of my authors) state that there is an increase of eosinophiles in the blood in anaphylaxis. Dr. Roy states that there is an increase of eosinophiles in the tissues of vernal conjunctivitis, another proof that vernal conjunctivitis is an anaphylactic condition and that treatment based on that fact will give the best benefits.

CAUSE OF VERNAL CONJUNCTIVITIS

(2) Vernal conjunctivitis is caused by other conditions than atmospheric.

Dr. J. A. Thompson (*Jour. A. M. A.*, August 23, 1919, p. 578) reports a case of recurrence of nasal hydrorrhea with marked eye symptoms with every menstruation when the patient was passing through the menopause. I have a case that formerly had typical vernal conjunctivitis every spring, which was symptomatically relieved by a weak solution of eserin. Recently her father told me that she still had the attacks, but that they came on only with her menstrual periods.

H. K. Detweiler says that the non-seasonal type of anaphylaxis is due to the protein of animal hair, food and bacteria.

Gabrielides says that vernal conjunctivitis may be a manifestation of auto-intoxication.

Scheppegrell's law is that in order for an antigen to be positive it must be capable of producing a reaction not only during the hay fever season, but at any time of the year. In other words, it must pass both botanical and physiological tests. Vernal conjunctivitis is caused at any season if the patient is exposed to the proper antigen. I have seen cases at all seasons of the year.

As spring used to be considered an exciting factor, it was called vernal conjunctivitis. Reviewing the allied anaphylactic conditions, we may find something of special interest. For instance, in about 1828, Bostock was the first to say that hay fever was due to heat. For numbers of years many agreed with him. Phoebus, in 1862 (in "Der typische Fruhsommer-Katarrh, Giessen) makes an interesting observation with respect to the seasons of the year. He considered that hay fever was due to some recondite quality possessed by the first heat of the summer which the heat later in the summer was not endowed with. In later years the heat theory was thought less of and hay fever was thought to be due to pollen. Still later it had been found to be due to some antigen to which the patient is sensitized. Heat is even now prominently advanced as the cause of vernal conjunctivitis. The first heat of summer comes in the spring. Spring used to be considered the cause of spring catarrh or vernal conjunctivitis. Many still claim that heat at any time is the cause of it. It is possible that in warm weather the antigen is more prevalent or more active. Other than that heat has no bearing upon the etiology.

Since many are exposed to the antigens that cause vernal conjunctivitis, hay fever, or asthma, and only some develop it, there must have been some previous sensitization (Hollopeter, Mackenzie 1884, Sajous 1884) of the body by a protein introduced in the blood system, which has caused the formation of a precipitating antibody located in the fixed cells. These sensitized cells have a wide distribution, but some places are more exposed to the influence of the antigen than others, these places being the conjunctiva, nasal mucosa and bronchial mucosa.

In vernal conjunctivitis the sensitiveness is due to fixed cellular antibodies.

H. H. Dale (in "Specific Sensitiveness and Anaphylaxis," *British Medical Journal*, January 14, 1922) Dr. Weil, Dr. F. Coke, Dr. Racheman and others state that

"Anaphylaxis is due to the formation of a cellular antibody of the precipitin nature."

"It takes some time after the injection of the protein for these cellular antibodies to form, but with the complete formation the animal is sensitized"—(Hollopeter).

The antibodies then have disappeared from the blood and become intracellular. Coke calls it an antigen antibody reaction. Scheppegrell, April, 1922, says that

"An increased susceptibility to hay fever after the initial attack is due to the sensitized condition resulting from the absorption of the pollen protein. The antibody resulting from this reaction is probably of the anaphylactic type, which favors a reduced resistance to further sensitization."

Given a patient sensitized, H. H. Dale, Noon, Freeman and others state that the antigen acting upon the antibodies in the fixed cells of the sensitized patient causes the anaphylactic symptoms. The types of symptoms vary according to the locality affected. In the conjunctiva there is vernal conjunctivitis; in the nose, hay fever, etc. Places are more frequently affected that are the more exposed.

H. H. Dale and C. H. Kellaway, in "Anaphylaxis and Anaphylotoxins" (*Philosophical Transactions*, Royal Society of London, series B. V. ii, pp. 273-315) say:

"Direct evidence is presented in favor of the view that anaphylaxis is produced by an antibody in the cells of the tissues. The same antibody, when free in the circulating blood or in the fluid surrounding an isolated muscle, has a protective function."

The idea of cellular antibodies and circulating antibodies was first suggested by Yonge, who called them endo- and exotoxins ("Treatise of Hay Fever and Sneezing," 1910) and by Carl Oppenheimer. So the idea is not absolutely new, but it has been emphasized in many papers of 1922. Drs. A. Lathan and F. Coke ("Sensitization of 270 Cases of Asthma," the *Practitioner*, August, 1922), as a result of experiments, state:

"The anaphylactic irritation is located in the cells of the tissues and not in the blood, as is proven by the bronchial spasm present in the lung, even after it is washed free of the blood, which spasm occurs when the lung is perfused with the solution of the original protein."

This experiment proves what Sir Andrew Clark denied in 1886.[14 17 28]

There is much written on the cellular location of the sensitizing antibody, but the above expresses the view clearly and concisely.

Bacterial vaccines benefit these types of cases, but as to the exact way that the vaccines furnish their protection there is also some difference of opinion. Two main views are held: (1) that the benefit is due to the tonic effect of the vaccine; (2) that it is due to an immunizing influence produced by the bacterial vaccine's causing an increase in the circulating antibody, which circulating antibodies afford protection.

The tonic effect view is put forward by Dr. C. H. Sherman in "Site of Antibody Formation" (*Am. J. Clin. Med.*, July, 1922) and also by Dr. I. M. Mullich (*Calcutta Medical Journal, August*, 1911). This view is best discussed by Dr. V. Dabney (*New York Medical Journal*, Feb. 10, 1912, p. 275), who offers a plausible explanation of the tonic effect of vaccines by means of Ehrlich's side chain theory. Now with regard to the immunizing influence[2] of vaccine injections by increasing antibody formation, Dr. F. M. Racheman in "Mechanism of Hay Fever" (*Archives of Internal Medicine*, August 15, 1922), speaking of the difference between allergy and immunity, says that

"In allergy the antibodies are predominately in the fixed cells. This is when the patient is sensitized. . . . But in immunity the antibodies are predominately in the circulating blood. The patient is then protected and will show no symptoms even if the antigen is injected."

The vaccines benefit by increasing the antibodies in the circulating blood. As to the mechanism by which these bacterial vaccines cause an increase of circulating antibodies, there is also some difference of opinion. Dr. Danysz and Dr. Sherman claim that their beneficial effect is not due to their protein content. The other group of doctors, Dr. Coke ("Asthma and Anaphylaxis," *British Medical Journal*, March 21, 1921), Dr. H. H. Dale (*British Medical Journal*, January 14, 1922), and Dr. F. M. Racheman (*Archives of Internal Medicine*, August 15, 1922), held that the protein and not the toxic value of the vaccines is the cause of the circulating antibody formation. Dr. Sherman says: "The production of anaphylaxis varies inversely with the toxicity of the infection."

This excess of circulating antibodies catch whatever happens to be the antigen that produces vernal conjunctivitis, hay fever, asthma, etc., and put it out of action before it reaches the sensitized cells. When this excess of circulating antibodies is used up the sensitiveness returns. I recently saw a case which illustrated this. The patient was to return for another injection in four days. He returned in ten days, stating that seven days after his last injection the ocular symptoms had returned. Summing up opinions, we may say that given a condition of sensitiveness to an antigen, or given a case sensitive to the causative factors of vernal conjunctivitis, vernal conjunctivitis will not be produced if the proper circulating anti-

bodies are made to circulate in the body fluids. Such circulating antibodies can be produced by the injection of vaccines. I have been using the kind of vaccines used by Dr. Scheppegrell in New Orleans, La. He states that the organisms that cause hay fever are the micrococcus catarrhalis, Friedlander bacillus, pneumococcus, streptococcus and the staphylococcus aureus and albus. Mulford's serobacterin may be better than the other forms of vaccines on account of the increased proteins it contains. Dr. A. Vander Veer, Jr., in "The Present Status of the Treatment of Hay Fever and Asthma" (*Am. J. Med. Sc.*, July, 1922), from a summary of 2000 cases, says that we must learn to discard the word "cured." We may have to do the same thing with regard to vernal conjunctivitis, but we should by use of allergens determine if possible the causative antigens and remove them, and try to immunize against those that cannot be removed.

Dr. Jackson (*Am. J. of Ophthal.*, April, 1916) gives a very complete view of vernal conjunctivitis, classifying various etiological and other factors. I am not going to take up your time giving you my classifications, but conclude with a summary of the treatment.

PRESENT TREATMENT OF VERNAL CONJUNCTIVITIS

℞ Tannic Acid.....1% or less
or ℞ Ichthyol. .....1% or less
or ℞ Sod. Hypersulphate .....1% or less
or ℞ Pot. Chlorate .....1% or less

I have found eserine grs. ⅛ oz. 1 of benefit in some cases.

To these may be added the treatment by x-ray or by radium, both of which have some dangers connected with them, as I have seen even when used by skillful hands. I heard of one case in October of this year where the hair follicles of lids were destroyed. I am hoping that the vaccine treatment may be found more successful and less dangerous.

CONCLUSIONS

(1) Vernal conjunctivitis is an anaphylactic condition.

(2) As vernal conjunctivitis has an antigen as its etiological factor, we may say that:

(a) The predisposing factor of vernal conjunctivitis and allied anaphylactic conditions is a cellular antibody of the precipitin nature, producing a sensitized patient.

(b) The exciting factor is some antigen.

(c) The protection is furnished through circulating antibodies produced by vaccines neutralizing in the blood the exciting factor.

(3) Since vernal conjunctivitis is an anaphylactic condition, cases of vernal conjunctivitis should be tested out with allergens, just as cases of asthma and hay fever are now tested.

(4) Treatment based upon these tests may be found even more effective than the vaccine treatment.

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DISCUSSION

Dr. K. W. Constantine, Birmingham, Ala.—Vernal conjunctivitis is a very rare disease in the vicinity of Birmingham. The few cases that have come under my observation gave a history of having had treatment from one to several years with strong caustics, and with marked distress in every way. By looking after the general condition of these patients and using mild local medication, especially dilute acetic acid, they are often relieved of the symptoms. As yet I have not used any vaccines in these cases, but I believe there is indication for this procedure.

Dr. Phinizy Calhoun, Atlanta, Ga.—There is strong clinical evidence, according to the investigations of Fort of Atlanta, that vernal conjunctivitis is due to a local seasonal irritant. In our clinic the disease is common in the negro child, both in the pure-blooded and the mulatto, commencing at various times in the spring, and depending, we think, upon how early the flowers bloom.

Fort's idea is that there is a similarity between vernal conjunctivitis and hay fever, and upon this hypothesis he uses the commoner plant vaccines. In most instances he obtains a distinct focal reaction, but from the use of no constant pollen.

His treatment, besides a local wash of zinc sulphate solution, has been the subcutaneous injection of pollen vaccines, with an apparent improvement. An eosinophilia (both local and general) is the only constant laboratory picture in vernal conjunctivitis, and it is commonly known that certain local irritants, notably powdered ipecac, commonly used by soldiers to induce a conjunctivitis, will produce it. It is therefore reasonable to believe that pollen or plant irritants may be the responsible factor in the causation of vernal conjunctivitis.

While the thought expressed in Dr. Townsend's paper is in the experimental stage, it is well worth considering. In the meantime, until this or some other idea can be developed, I employ radium as the only therapeutic agent which will definitely cure vernal conjunctivitis.

Dr. W. E. Driver, Norfolk, Va.—At the meeting of the French Medical Society in Strasbourgh in March of this year there was a symposium on anaphylaxis, in which what we know and what we do not know about anaphylaxis was pretty well threshed out. It seemed to be established there that we can get away from the idea that anaphylaxis is solely produced by the interaction of antigens and antibodies. Such men as Widal, Richet and Bordet have established that you do not necessarily need a nitrogenous substance to produce anaphylaxis.

In 1913, Bordet showed he could produce most marked anaphylactic conditions with agar agar, and Widal showed that we could have definite anaphylaxis from cold. As demonstrated by one of Widal's patients, an anaphylactic condition not only was produced by aspirin and antipyrin, but also by polyps in the nose. When these polyps were removed asthma ceased and when the polyps came back asthma returned. The same patient had asthma from the emanation of sheep.

We know definite auto-anaphylactic conditions from x-ray, heat and cold. I should like to mention a patient who was referred to me because his ears stopped up if he took a cold bath, or washed his face in cold water. I immersed his hands in cold water and found on examination that he had a typical edematous condition of the eustachian tube and middle ear. The history he gave was definite. He said he had abandoned bathing his hands and face in cold water. Such reaction to cold is not new. Murri described a similar condition in some papers published from 1880 to 1886.

I think Lumiere's hypothesis as to colloids and the unstable colloidal equilibrium in some persons who may be upset by x-ray, heat, cold, pollens, pretein, etc., is worthy of consideration. Therefore how can you tell whether vernal conjunctivitis is due to pollen of the spring time or to heat? I have seen these cases clear by the use of cold applications. I cannot see how we can definitely treat these cases by vaccines. It would be more rational to go back to the idea of using the person's own serum in small doses and not allowing enough time to elapse to produce anaphylactic shock. This treatment suggested by Besredka seems far more rational to me than the use of haphazard pollen vaccines.

Dr. Townsend (closing).—Colds, of course, are one of the causative factors. As you find an increase in the variety of bacterial causes and of food and of plant antigens, you find that you have just so many more antigens to test the sensitiveness of your patients for.

In acute attacks of hay fever, the bacterial cause seems to have a great influence, because you first reduce the acute attack by bacterial vaccines and then desensitize them by pollen extract.

CONSERVATISM IN NASAL SURGERY*

By W. W. Potter, M.D.,
Knoxville, Tenn.

I wish to bring to your attention and discuss in a general way some of the most common pathological conditions seen in

*Read in Section on Eye, Ear, Nose and Throat, Southern Medical Association, Sixteenth Annual Meeting, Chattanooga, Tenn., Nov. 13-16, 1922.

the nose, the most frequent operative procedures instituted for the relief of these conditions, the after treatment and end results.

Man is not so dependent on the sense of smell as a guide in selecting the proper food for the body, or for protection, as some of the lower animals; therefore, the most important function of the nose is the receiving, purifying and warming of the air we breathe. Anything, be it foreign body, polypi, deviated septum, or hypertrophied turbinals, that in any way interferes with this function is a menace to the health and welfare of the individual, and should be removed, or corrected.

When we speak of intra-nasal disease we usually mean sinus disease. Diseases of the accessory sinuses account directly or indirectly for practically all of the intra-nasal operations that are performed, and the pathological conditions necessitating these operations are in practically all instances caused by some obstruction or interference with the natural drainage and ventilation of these accessory cavities, the removal or correction of which will result in the relief and cure of most cases. However, many of us have been, and some still are, too enthusiastic in operating upon nasal pathology.

I take it we are as one in the belief that the main object of these operations is to establish proper drainage and ventilation of the nose and accessory sinuses. Therefore to accomplish this with the removal or destruction of as little tissue as possible should be the aim of every nasal surgeon.

It has always been a simple matter to remove the middle or the inferior turbinate, and in spite of the fact that this operation is rarely ever necessary or indicated, some of us continue our ruthless destruction of these most important structures. Some operators maintain that the loss of the middle turbinate is of little consequence, and they invariably remove it before any ethmoid operation. With a few exceptional cases this is possibly excusable, but as a rule it is unnecessary, and radical in the extreme. Pratt maintains that it is unnecessary in ethmoid operations, and suggests that the middle turbinate be infracted and pushed to one side, and replaced when the ethmoid operation is finished. I heartily agree with him in this instance.

It is sometimes necessary to remove certain portions of the turbinates, such as hypertrophies of the posterior tip of the inferior, or the anterior superior tip of the middle turbinate preceding intra-nasal frontal sinus operations, or possibly the anterior tip of the inferior turbinate when a large opening is desired into the maxillary sinus, but care should be exercised to preserve as much of these structures as possible. A nose without turbinates will eventually become dry and scaly, and upon inspection will remind one of looking into a rusty gun barrel. It is about as serviceable as far as its chief function is concerned, and in addition troublesome pharyngitis invariably follows.

In our clinic we see a goodly number of negro patients, black big nosed individuals, in whom I have often observed a condition of the inferior turbinate which I believe to be peculiar to the negro. These are large spongy cauliflower-like masses that completely block the nares, and in some cases project into the phaynx. The turbinal bone proper is of the same soft spongy nature, and nothing short of complete removal of these masses will afford the patient relief. Most of these patients show a positive Wassermann, but the protracted use of anti-syphilitic treatment does not restore the turbinates to normal. And owing to the fact that the majority of our negro patients show positive Wassermann reactions, regardless of this particular condition, we have been slow to believe it to be due to syphilitic infection. Tuberculosis is also common among negroes, but we have been unable in these cases to diagnose tuberculosis in the lungs, or elsewhere, and cannot believe it is a primary tuberculous infection. It differs from the papillary hypertrophy of the turbinates, which is frequently seen, in that the hypertrophy is not confined to either end, but extends throughout the entire turbinate body, and was confined to the inferior turbinate in all of these cases. However, from a histological standpoint, there is some similarity in that in both there is marked hyperplasia of the fibrous tissue in the subepithelial layer, with considerable edema. In a period of twelve years I have never observed this particular condition of the inferior turbinals in a white patient, and therefore have concluded that it is peculiar to the negro. In

this particular type of case only have I ever found it necessary to remove the entire lower turbinate, and then only after repeated cauterizations failed to restore the turbinals to normal.

A deflected septum is the direct or indirect cause of practically all intra-nasal diseases, and were it not for this most common deformity, we, as rhinologists, would cease to be of very much use in our communities. The septum is deflected either from trauma or faulty development, and in either case if there is a marked deflection, the turbinates are sooner or later involved, preventing the proper aeration and drainage of the sinuses, consequently sinus disease is very likely to be the result. The sub-mucous resection is the only operation to be considered for the correction of the deviated septum, and I have nothing but praise for this operation when it is indicated, and when it is properly performed. But there are outstanding indications for it, and we should be careful that our enthusiasm for it does not interfere with our best judgment as to when it should or should not be done. A nose with a perfect septum is very rare, and there are a great many persons with more or less marked deformity of the septum who never develop symptoms which would justify a sub-mucous resection. We should have in mind indications, and contra-indications, and practice conservatism in selecting cases for this operation. A well-performed sub-mucous resection will facilitate drainage and ventilation of the ethmoids, and frequently relieve the patient of symptoms such as headache, sneezing, ocular disturbance, etc., which are attributable to ethmoid disease, and oftentimes render an ethmoid operation unnecessary.

As stated above, sinus disease accounts directly or indirectly for practically all intra-nasal operations. The ethmoids are more frequently involved than any of the sinuses, and not infrequently suppuration in adjacent sinuses ceases very soon after the ethmoids are opened and drained. This well-established fact should encourage us to deal more conservatively with some of these sinus conditions than we have been accustomed to in the past.

All of the classical ethmoid operations described and illustrated in the literature and text books are radical operations. They contemplate the complete exenteration of the ethmoid cells, and even the removal of the immediate adjacent normal tissue. Some rhinologists advocate this in all cases of suppurative ethmoiditis; but to my mind the results obtained do not warrant such a radical procedure. The majority of these cases will respond most readily to more conservative measures, such as the correction of any deformity of the septum or middle turbinate to insure the proper drainage, the intelligent use of suction and irrigation, and the proper attention to the diet. The diet I believe to be most important if the patient is a child. Sinusitis is not so rare among children as we formerly thought. It is very common in certain sections of our country. The removal of tonsils and adenoids will clear up about 90 per cent of sinusitis in young children, and practically all of the other 10 per cent will be cured by irrigation or suction, or both, with proper attention to diet, if the climatic conditions are good.

No infant or young child should be subjected to any sinus operation except as a last resort, or until all other measures have failed. The diagnosis should be clear, and the prognosis well guarded. In adults where it is deemed advisable to attempt complete exenteration, it is impossible for most of us to know whether or not we have removed all of the diseased cells, and this fact accounts for the two or more operations necessary in practically all of these cases before a cure is obtained. When the removal of all the cells is contemplated, Reeves has called attention to the importance of conserving the muco-periosteal membrane, and to do this it is necessary to use a biting forcep guided by sight, rather than a curette guided by the sense of touch. It is well to remember that one can be conservative and still remove all of the diseased cells or polypi that present themselves to view. A radical operation on the sphenoid sinus is very seldom necessary except in rare instances where serious complications arise.

The diagnosis in sinus diseases is very important, and to determine the proper treatment in some cases is very difficult. The radiograph is of value only in determining the size of the sinuses, and should be had in all cases where operation is contemplated. Transillumination is of some value as an aid in diagnosing frontal or

maxillary sinus disease, but of no value in diagnosing ethmoid or sphenoid disease. Stucky's remark that the presence of a little pus in the nose is no indication for a surgical operation is a wise one, and should be borne in mind by every one who is called upon to diagnose and treat intranasal pathology.

DISCUSSION

Dr. W. T. Patton, New Orleans, La.—One of our men, a good man, reported 16 radical frontal sinus operations in one year. The rest of the hospital had had one. He showed that he had an idea he could do this operation and he was going to do it. The older men grow and the more experienced the less do they do radical work in sinuses.

A proper sub-mucous operation is one of the best operations we can do, without sacrificing important structures. I want to emphasize "proper" sub-mucous operation. If it is not done entirely you will not get good results. Every bit of deformity that is causing lack of drainage must be corrected. In many septum cases you are surprised to find how much deviation there is after the tissues are shrunken. You usually have to go back to the sphenoid bone to get an absolute correction of the septum. I am not always so radical, but when there is a deformity, I correct it by sub-mucous. If you leave a little deviation it throws the membrane out of balance all the way back.

I do not believe in the sacrificing of a turbinate. The simple method of fracturing the middle turbinate will often answer. The same thing will hold true in the inferior turbinate.

I believe in all radical sinus operations we have trouble. They all come back every time they catch cold. We can expect it. The wound is bound to fill up either with granulation tissue or scar tissue, and every time they get a little infection the sinuses give trouble again.

I had one case, a negro with blocked nose. I did everything to his inferior turbinate, but could not get room. He had a slight deformity of the septum, and I thought by removing the septum I could possibly get rid of this condition. I did a sub-mucous, or attempted to, worked three-quarters of an hour. I never did find any bone or cartilage in his septum. I saw another case like that. It would be interesting to know whether the negro has cartilage or bone in his septum. I finally had to cut off part of the inferior turbinates.

Dr. John J. Shea, Memphis, Tenn.—It is all right to be conservative before you operate. Give treatment a good chance; look after the endocrines, diet, and all that; but when you do operate, do sufficient work to get results.

There are two or three things I think important to do. In the first place, the ventilation must be good from before backwards. In the army we saw hundreds of men who had two sub-mucous operations. You could put in the nasal speculum and have an apparently ventilated nose because the part that was pushed back by the speculum was obstructing their breathing. You cannot always start the incision inside of the cartilage. Quite often the front piece of that cartilage must be taken off and the front door opened to get any air into the nose.

When a septum is replaced in the median line and comes into contact with the middle turbinate of its previous concave side, it is best to amputate this turbinate. Otherwise, the patient will merely have exchanged an obstruction on one side of the nose for an obstruction of the other side.

In ethmoid work, remove the middle turbinate completely and give it a chance, and then you will get results. If you do go into the ethmoid cells, like the mastoid, it must be done completely. There is no half-way operation on the ethmoids. In order to be sure that you have all the cells open, you must start back at the sphenoid and from the anterior wall of the sphenoid open up all the posterior ethmoid cells and come forward and take off the uncinate membrane. Be conservative the day before you operate, but when you do operate, do what is required.

Dr. Robert W. Bledsoe, Covington, Ky.—Ten or twelve years ago it was not at all uncommon for men doing nasal surgery to remove almost the entire inferior turbinate. Many times I have seen a piece of inferior turbinate a half inch in thickness and two or three inches long removed. I think today surgical procedure of that sort is very rare, but a paper on conservatism is timely.

I would like to call attention to one point regarding submucous operation. Within the last year or two I have seen a number of atrophic rhinitis cases with tremendously deflected septa, the principal focus of infection occurring on the enlarged side of the nose. In other words, the badly diseased side was on the concave side, whereas the good part of the nose was on the convex side. I recall one I have on hand now in which I would consider it bad surgery to do a submucous resection. The concavity is on the left side, the convexity on the right. On the concave side there is practically no middle nor inferior turbinate. The nasopharynx and, I believe, the eustachian tube, are almost completely scar tissue instead of normal mucosa, and there is infection of the eustachian tube and middle ear. This man is very anxious for relief. I have promised him relief on one condition, and that is if I can build up the septum. If I can create a deflected septum on the left side as I have on the right, I believe that will do this man a great deal of good; whereas, if I were to do a submucous resection and remove the convexity from the right side, I believe his trouble would not only be on the left side, but progress to the right side.

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EDITORIAL DEPARTMENT

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PROBLEMS OF THE NEW TYPE OF DEEP X-RAY THERAPY

The introduction of the new high voltage x-ray machine has provided a therapeutic agent which has been shown to have an undoubted and often marvelous influence not only upon primary malignant growths, but also upon the secondary metastatic processes. There is a consensus of opinion among roentgenologists both in this country and abroad that it is an agent which has produced results which the old type of x-ray apparatus could not approximate.

Experience has shown that this agent is not devoid of danger, and many fatalities from its employment have resulted. Most of these ill results in the past have been caused first, by the inability of the roentgenologist to measure with any degree of accuracy the amount of radiation which will reach a given point; secondly, because not until recently were there biologic studies which furnished any conception of the amount of radiation necessary to affect a given tumor; and thirdly, because there was not a sufficient realization of the systemic effect of these rays upon the blood-forming organs.

The accurate measurement of the dosage and frequent blood examinations to determine the leucocyte count will avoid entirely the danger, which has been shown to exist, of producing aplastic anemia by over-dosage. A decided drop in the leucocyte count is an indication for the cessation of treatment for the time being; and treatment should not be resumed until the white cell count returns to normal.

Sometimes, after the patient has received these rays over a prolonged period, particularly if large areas of the body have been radiated, nausea, malaise and other minor symptoms of ill-being develop. When these symptoms occur, treatment should be discontinued. They usually disappear rapidly after the cessation of treatment.

This work is still in the experimental stage, though it has already given some remarkable results. Members of the Association have done much toward advancing it. To prevent repetition of one's mistakes, so far as possible, dosage should be described accurately for each reported case.

A method of measuring the amount of radiation given to a particular area is now available to all, and the roentgenologist who fails to avail himself of it will lay himself open not only to severe criticism, but possibly to damages. Last, but not least, his work will be of absolutely no scientific value. Unfortunately even at this late date many roentgenologists who are employing this new form of deep x-ray therapy have not availed themselves of this accurate scientific method of measurement.

ORIGIN OF MALARIA IN THE AMERICAS

The question has often been asked, did malaria exist in America prior to Columbus' discovery? We are inclined to doubt it. However, anopheles mosquitoes did exist here, the American species differing from those of the Old World; and when the parasites were introduced by European and African carriers, malaria quickly spread both from them and from the infected Indians.

The historical evidence for this is rather convincing:

(1) In the early expeditions of Europeans coming from reasonably healthful regions and simply passing through hitherto unvisited Indian country, extensive sickness is rarely recorded, except that due to hardship and starvation. This is true even when the region traversed by the expedition is now malarious and was at that time physically well suited for the production of anopheles mosquitoes, and doubtless was then producing them. In a number of such instances the absence of sickness is implied and in some specifically mentioned.

(2) When, however, a fairly prolonged stay or settlement was made by Europeans in places which are now malarious, "fevers and calenturas" very generally developed and in many cases were deadly. This was especially the case when the expeditions came from, or via, places (usually in America) where such fevers were prevalent. Even a somewhat prolonged stay at one place—as when Orellana remained "over the whole of Lent" at one place on the Amazon—did not lead to sickness when the Europeans had been long resident in regions free from malaria.

For example, (1) The implication is strong that there was no serious sickness —if there was any—in Oxenham's expedition of 1575 across the Isthmus of Darien and return until he had gone into a fairly permanent camp on the north coast in the country of the "Cimaroons," negro slaves who had run away from the Spaniards. Yet Isaac Strain of the U. S. Navy, in 1854, with all the facilities of that much later period, lost a number of his men from fevers on crossing one way and could not have made the return journey.

(2) Drake's Darien expedition, of 1572, reported no sickness until they had been long in permanent camp on the north coast of the Isthmus and practically in communication with Spanish settlements. They had been in the country about six months before the outbreak of "calenturas" showed up and that may, or may not, have been malaria.

(3) Raleigh's expedition of 1595 by boat and on foot up the Orinoco for 400 miles is worthy of mention.

To quote him, "Moreover the country is healthful; as 100 persons and more which lay (without shift most sluttishly and were evry day almost melted with heat in rowing and marching and suddenly wet againe with greate showers and did eat all sorte of corrupt fruits and made meales of fresh fish without seasoning: of Tortugas: of Lagartos and of al sorte good and bad without either order or measure and besides did lodge in the open air evry night) we lost not any one, nor had one ill disposed to my knowledge, nor found anie Calentura or other of those pestilent diseases which dwell in all hote regions so near the Equinoctial line."

He entered the river the latter part of March or early in April—was there in the rainy season—and made it his business to stop at Indian villages. This result could not now be duplicated even with quinin.

(4) Orellana's long voyage down the Amazon in 1541 entailed little (and apparently no) loss from sickness, although the

men were broken by privation and starvation before they started,—seven dying of hunger. They made at least two prolonged stops,—one of not less than 47 days near the mouth of the Napo (building boats) and one of 18 days, repairing them some months later. They had much communication—hostile generally—with the Indians and got their provisions from their villages.

At present from such a trip of over seven months, and without quinin, we should expect a loss of over 75 per cent of the expedition.

(5) The first invasion of Tabasco by Cortez, in 1519, was apparently not followed by sickness among his men; yet in 1529, when Montejo wished to use this province as a base for the invasion of Yucatan, it was so unhealthful that the Spaniards, occupying it since 1523, were on the point of abandoning it. It is bad enough now, from malaria.

(6) There were deaths, probably a number of them, in the expedition Cortez led across the wet lands of Tehuantepec and southern Campeche and Yucatan to Honduras in 1524-5; but they seem to have been due to privation and hardship rather than disease. They even ate their guides ("a strategic error," records Capitan Don Bernal Diaz) and thus lost their way. Had that country been as malarious as it is now, those Spaniards and Mexicans from the highlands had probably never reached the Honduran coast.

(7) The sanitary condition of the country adjacent to the port of Vera Cruz (Medillin) changed much for the worse both for Spanish and Indians after its occupation as a permanent settlement from, say, 1519, when it was first occupied and when we hear nothing of its unhealthfulness, to 1537 when Bishop Marroquin complained so bitterly of it.

For the second part, settlements once established in places now recognized as malarious soon or in time became unhealthful, sometimes extremely so, as Isabela, Nombre, de Dios, Vera Cruz, Sta. Marta, Martinique, the Guianas, Jamestown, Biloxi, Port Royal (S. C.), New Orleans, Savannah, etc. It is to be noted that almost as soon as these settlements in Spanish and French America were established, negroes direct from Africa were introduced.

Compare this with Africa. Europeans visiting the West Coast of Africa—even the first visitors— came away with fevers, although the visit may have been very brief. No stay on any West African river comparable to Raleigh's on the Orinoco or Orellana's on the Amazon was possible without an enormous loss of life, possibly of the whole expedition judging from the loss of staying a shorter time. When in the voyage to America vessels stopped at West African ports, whether mainland or on the adjacent islands, we find almost invariably (no expressed exceptions are recalled) that they suffered from fevers during the remainder of the voyage before reaching America. Such was the case with Hawkins, in 1567, with Drake and Carleisle, in 1588, and with very many others.

It seems highly probable, therefore, that malaria was not indigenous to North, Central or South America at the time of their discovery by the white man, and their settlement by him and the negro.

HONESTY IN SCIENTIFIC WORK

Severe criticism was heard of the false claims of a speaker at a recent large medical convention. Marvelous results in treatment were reported by one who advanced no new theories or modifications of technic to account for them. Apparently he

desired a credit which was wholly undeserved. All present were impressed with the fact that an untruth was being uttered and all felt shocked at its occurrence in a scientific gathering. This is indicative of something which might occur anywhere, but which, if it happened with any frequency, would undermine all faith in research work and make progress in medicine impossible.

Liars are indigenous to all climes and are exempt from no classes. But the idea of a physician's trying to secure unmerited glory by misstating facts is revolting.

Science in general, and the medical profession in particular, prides itself upon the fact that experiments and clinical cases are described as they occur. Enthusiasm and human limitations of the author often color the deductions, but the basic data must be accurate. Exceptions to this rule are fortunately rare.

Honesty is the fundamental virtue that differentiates the ethical physician from the charlatan. Those occasional misguided ones who deviate from this principle deserve the condemnation which they universally receive from the profession.

SOUTHERN PEDIATRIC SEMINAR

The number of small communities in the South and the remoteness of many of them from the larger centers, make the pediatric specialist inaccessible to many who would otherwise seek his services.

The need of more post-graduate courses in pediatrics for the general practitioner and the specialist has long been apparent; as the Southern physician has more and more tried to perfect himself in children's diseases.

With this in view, a few seasons ago, the Southern Pediatric Seminar was established at Saluda, North Carolina, and it has been repeated with increasing attendance for two weeks every summer since then.

The Seminar is held high up in the North Carolina mountains in connection with the Infants' and Children's Sanitarium where the climate is ideal for study and recreation, and where many infants are brought for the treatment or prevention of illness. The sick or well infant's diet is taken care of by a special diet kitchen and proper food, and pleasant surroundings permit of a rest for parents and children.

The staff is made up of lecturers selected from over the South. The Seminar fills a need and will doubtless grow steadily in popularity.

Correspondence

MEDICAL WORK AMONG THE LEPERS OF KOREA

Editor, SOUTHERN MEDICAL JOURNAL:

I have under my care at our Mission at Kwangju, Korea, 500 lepers; and as this work is done entirely by charity we are usually very short of drugs, instruments and supplies. Often physicians in the South are retiring from practice or taking up special work and have instruments that we could use to advantage. And then there are those who have instruments that are somewhat obsolete in their work but not so in ours.

Our lepers do much of their own medical work and give these 500 oil injections every Saturday. The following articles we use chiefly: hypodermic syringes that will take oil and needles for them, knives or bistouries, dental and artery forceps. We can also use, and have need for, nearly any surgical instruments, razors, caps, gowns, sheets, bandages, medical tablets, etc. In sending these they should be made up in a small bundle, well wrapped and tied, and mailed by parcel post to Dr. R. M. Wilson, Kwangju, Korea, and marked "Gifts for the Leper Hospital". Not more than eleven pounds can be sent in one package.

For the lepers we also need a sterilizer and microscope, and for the general hospital a dental chair. Write me first about instructions for sending these larger articles.

Nurses in hospitals and physicians' offices could render a great service by saving bandages and gauze, having it washed out and sent to us. We never have enough of this kind of supplies.

Four dollars per month supports a leper. Two hundred and fifty dollars will erect a brick cottage to accomodate ten inmates.

Any aid our medical friends can give will be greatly appreciated.

Yours fraternally,

R. M. WILSON, M. D.

Montreat, N. C., June 26, 1923.
Permanent address: Kwangju, Korea.
Address until August 12: Montreat, N. C.

(Editor's Note: Dr. Wilson is from the South and is in charge of the medical and surgical work of the Mission of the Southern Presbyterian Church at Kwangju, Korea. He attended the meeting of the Southern Medical Association last November and a paper read by him there in the Section on Dermatology and Syphilology on "Treatment of Leprosy" appears on page 507 of this issue.)

Book Reviews

Translations of Selected Passages from De l'Ausculatation Mediate (First Edition). By R. Theophile H. Laennec. With a biography by Sir William Hale-White, K.B.E., M.D., Consulting Physician to Guy's Hospital; President of the Royal Society of Medicine. Medical Classics Series. 4 illustrations. 193 pages. New York: William Wood & Co., 1923. Cloth, $3.75.

The great influence of Laennec's work on modern medicine is so well understood that this feature of the book needs no comment.

Sir William has written an appreciative biography. His translation is perfect in not only making us comprehend what it was the intention of the author, Laennec, to convey, but even the style has been retained.

The selections are well chosen and give a vivid idea of the great insight and industry of Laennec.

One could wish that Sir William would translate the full text, so that we might have this book with his annotations to serve as an inspiration to all of the medical profession.

Collected Papers from the Washington University School of Medicine. Vol. 1, 1921. With 347 illustration and 1079 pages. St. Louis: C. V. Mosby Co., 1923.

The volume is a compilation of the papers contributed during 1920-1921 by members of the faculty of the Medical School.

These sixty-five articles have been selected with a view to their practical application to clinical medicine. They cover a different field of medicine from the purely philosophical contribution of Dr. George Dock on "The Social Trend of Medicine" to technical papers such as that of Drs. Canby G. Robinson and George R. Herrman on "Paroxysmal Tachycardia of Ventricular Origin and Its Relation to Coronary Occlusion." Phases of dermatology, pediatrics, ophthalmology and oto-rhino-laryngology are also included, as well as certain subjects in the field of surgery and radiology.

Cerebrospinal Fluid. In Health and Disease. By Abraham Levinson, B.S., M.D., Associate in Pediatrics, Northwestern University Medical School; Attending Physician, Department of Contagious Diseases, Cook County Hospital, Chicago; Attending Pediatrician, Sarah Morris Hospital for Children of the Michael Reese Hospital, Chicago; Attending Pediatrician, Mount Sinai Hospital, Chicago. 69 illustrations, including 5 color plates. Second edition, thoroughly revised. St. Louis: C. V. Mosby Co., 1923. Cloth, $5.00.

In this very valuable little monograph, written by one who has long been deeply interested in the subject, there are a few omissions. Notably among these is one whose absence it is difficult to explain, namely, the increase of sugar in the cerebrospinal fluid as a sign of diagnostic importance in encephalitis lethargica.

The complete bibliography at the end of each chapter, as well as the appendix containing the monographs, is of great value for reference.

The book is a good one.

The Chemistry of Tuberculosis. Being a Compilation and critical Review of Existing Knowledge on the Chemistry of the Tuberculosis Bacillus and Its Products. By H. Gideon Wells, M.D., Ph.D., Director, Otho S. A. Sprague Memorial Institute; Professor of Pathology, University of Chicago and Rush Memorial College. Lydia M. DeWitt, M.D., A.M., Member, Otho S. A. Sprague Memorial Institute; Associate Professor of Pathology, University of Chicago and Rush Medical College. Esmond R. Long, Ph.D., Assistant Professor of Pathology, University of Chicago and Rush Medical College. 447 pages. Baltimore: Williams & Wilkins Co., 1923.

This book is the result of systematic work that has been done on the chemotherapy of tuberculosis at the Otho S. A. Sprague Memorial Institute since 1911. Its purpose, as stated, is to facilitate in some degree the study of the problems of tuberculosis and serve as a reasonably complete reference work on the chemical processes of interest to the student of this disease.

It is divided into three sections: Section I, The Chemistry of Acid-Fast Bacteria, by Esmond R. Long; Section II, The Chemical Changes in the Tuberculous Host, by H. Gideon Wells; and Section III, The Chemotherapy of Tuberculosis, by Lydia M. DeWitt.

The volume is primarily intended for the student who is fully familiar with modern biological and physio-chemistry. To those possessing this fundamental recent knowledge it should be of great value in outlining both the advances and lack of progress made by medical science in this branch of tuberculosis.

This highly specialized data forms a careful resume of work which has been done on the chemistry of tuberculosis, together with a valuable bibliography. Unique in its scope, it is needless to say that the book is destined to pass through many editions.

Laboratory Studies in Tropical Medicine. By C. W. Daniels, M B. (Camb.). F.R.C.S. (Lond.), Late Lecturer on Tropical Diseases, London Hospital, St. George's Hospital, and London School of Medicine for Women; Formerly Director, London School of Tropical Medicine; Director, Institute for Medical Research, Federated Malay States; Member, Royal Society Malaria Commission in India and Africa, and in the Medical Service of the Colonies of Fiji and British Guiana; Consulting Physician, Hospital for Tropical Diseases. And H. B. Newham, C.M.G., M.D. (Durh.), M.R.C.P. (Lond.), D.P.H. (Camb.), D.T.M. & H. (Camb.), Director, Department of Tropical Pathology and Warden of Studies, London School of Tropical Medicine; late Temporary Lt.-Colonel, Royal Army Medical Corps, and Consultant in Tropical Diseases, East African Forces. 184 text figures and 7 colored plates. 576 pages. Fifth edition, thoroughly revised. New York: William Wood & Co., 1923. Cloth, $7.00 net.

This book has long been a standard in the tropics. No matter how out of the way one may find a physician in the jungles, if he has only two books, this will be one of them. The reason is not hard to find: Daniels has done laboratory work under the same privations imposed by the tropics, and hence his directions and suggestions are the result of personal experience.

The methods advised are all practical; and the authors' position in tropical medicine makes their statements authoritative. The book is a desirable addition to the library of any physician working with tropical diseases.

Diseases of the Nervous System. A Text Book of Neurology and Psychiatry. By Smith Ely Jelliffe, M.D., Ph.D., Formerly Professor of Psychiatry, Fordham University, New York, and Formerly Adjunct Professor of Diseases of the Mind and Nervous System, New York Post-Graduate Medical School and Hospital. And William A. White, M.D., Superintendent of St. Elizabeth's Hospital, Washington, D. C., Professor of Nervous and Mental Diseases, Georgetown University; Professor of Nervous and Mental Diseases, George Washington University, and Lecturer on Psychiatry, U. S. Army and U. S. Navy Medical Schools. Illustrated with 475 engravings and 13 plates. 1119 pages. Fourth edition. Philadelphia and London: Lea & Febiger, 1923. Cloth, $9.50.

This well-known text book has gone into four editions in the past eight years, which speaks for its popularity with the medical profession.

There is not the space given to psyco analysis as in former editions. Like its past editions, it is a reliable text book. For one desiring the basic principles of the subject, the book can be recommended.

Internal Medicine. A Work for the Practicing Physician on Diagnosis and Treatment, with a Complete Desk Index, in three volumes. Illustrated with 427 text illustrations and 14 in color. 2120 pages. By James C. Wilson, A.M., M.D., Emeritus Professor of the Practice of Medicine and Clinical Medicine, Jefferson Medical College, and Emeritus Physician to its Hospital; Physician Emeritus, Pennsylvania Hospital, and Physician-in-Chief to the Lankenau Hospital, Philadelphia; Formerly Captain, M.C., U.S.A. Assisted by Creighton H. Turner, M.D. Philadelphia and London: J. B. Lippincott Co., 1923.

The first volume deals with diagnostic methods and procedures from the old and well tried methods of physical diagnosis to descriptions of many of the newer procedures available to the more progressive men who have a moderate amount of laboratory equipment. In this branch, however, it is not broad enough to be of any special value to the laboratory specialist.

The second volume deals with an account of the diseases generally considered in internal medicine. The third volume is confined to treatment.

In the first volume an unfavorable impression is given by reason of the many old illustrations retained. Substitution of new cuts would give the reader a better impression from the start.

In the second volume the sections on nephritis are not up to the standards of the rest of the book. The older method of classification is adhered to throughout. No mention is made of the well recognized changes in blood pressure accompanying chronic nephritis of all types, and, too, no reference is made of the blood chemistry changes in nephritis.

In still other respects the work is not so complete as one would like. The dietetic management of the various gastro-intestinal disorders could be added to with advantage.

The work was just too early also to include the latest findings in the pancreatic therapy of diabetes.

Notwithstanding the above criticisms, one will find much that is good in these three volumes.

Epidemology and Public Health. A Text and Reference Book for Physicians, Medical Students and Health Workers. In Three Volumes. By Victor C. Vaughan, M.D., LL.D., Emeritus Professor of Hygiene, University of Michigan. Assisted by Henry F. Vaughan, M.S., Dr. P.H., and George T. Palmer, M.S., Dr. P.H., Epidemiologist, Department of Health, City of Detroit. Volume II, Nutritional Disorders and Alimentary Infections. Precutaneous Infections. 53 text figures. 917 pages. St. Louis: C. V. Mosby Co., 1923. Cloth, $9.00.

The author states in his introduction that "we have not done justice to animal parasitic infections because space did not permit." This observation is true, for this section of the subject is not covered in the detail one would expect in a book of this kind. Knowing the author's ability, it is to be regretted that the publishers did not allow adequate space to present this subject. It also appears strange that in the discussion on typhus fever, which takes up the history of this disease in detail, there is no mention of Plotz bacillus or Rickittsia Prowazeki. Also there is no reference to the Weil-Felix reaction under this disease despite the importance now attached to it by the Federal and state health organizations.

The sections on nutritional disorders, the typhoid fevers and food poisonings are models of completeness. The remaining sections are well covered, and the book can be summed as a splendid presentation of the subject.

Rules for Recovery from Pulmonary Tuberculosis. A Layman's Hand Book of Treatment. By Lawrason Brown, M.D. Fourth edition, revised. 217 pages. Philadelphia and New York: Lea & Febiger, 1923.

This admirable little book, written for the sufferer of this dreaded disease by one of the masters in the field of tuberculosis, tells the story of the methods of a cure in non-technical language.

Dr. Brown, a man who probably has seen and treated more tuberculosis than any other living person, has embodied the fruits of his ripe experience. It should prove invaluable to the tuberculous.

The Medical Clinics of North America. Volume 6, San Francisco Number. May, 1923. Index Number. 248 text figures. 253 pages. Philadelphia and London: W. B. Saunders Co. Published bi-monthly. Paper, $12.00 per year.

The current number of the Medical Clinics is up to the high standard which from past experience one expects from this publication. It is a good number, and is even better than usual. It is a well rounded collection of clinical presentations.

Legal Medicine and Toxicology. By Many Specialists. Edited by Frederick Peterson, M.D., LL.D., Manager, Craig Colony for Epileptics; Formerly Professor of Psychiatry, Columbia University; Consulting Alienist, Bellevue Hospital, and Manhattan, Flatbush and Central Islip Hospitals for the Insane, New York City. Walter S. Hains, A.M., M.D., Late Professor of Chemistry, Materia Medica and Toxicology, Rush Medical College; Late Professorial Lecturer on Toxicology, University of Chicago. And Ralph W. Webster, M.D., Ph.D., Assistant Professor of Medical Jurisprudence, Rush Medical College; Director of Chicago Laboratory. Clinical and Analytical. Two volumes, with 242 text figures and 2 colored plates. 1196 pages and 92 text figures. 1072 pages, respectively. Philadelphia and London: W. B. Saunders Co., 1923. Colth, $20.00.

The editors have selected their contributors with care, and each subject is clearly presented. The first volume is given over to general aspects of legal medicine and the second to toxicology and laws affecting the practice of medicine and pharmacy as related to the dispensing of drugs.

The advice given to the physician and lawyer relative to expert testimony is of real value. The section on "Identification of the Living" by Alphonse Bertillon is an example of completeness. Volume II is given to toxicology. A splendid feature is that each volume has a complete index appended as well as a general index to both volumes in Volume II.

The whole subject is covered in such a thorough manner that it would be difficult to find a poorly presented section. The book has been revised and brought up to date in a most satisfactory manner.

A Text-Book of Pharmacology and Therapeutics. By E. Paulsson, Professor of Pharmacology, University of Christiania. English Edition, edited by W. E. Dixon, M.A., M.D., F.R.S., Reader in Pharmacology and Assesser to the Regius Professor of Physic, Cambridge. 519 pages. London: William Heinemann (Medical Books) Ltd., 1923. Cloth, 25/-.

The editor of the English edition directs attention to the Continental teaching of drug action and the method of their employment at the bedside. He has omitted comments or foot notes where the author differs from the views held in England, for he wisely remarks that the reader seeks the opinions of the author himself and not the comments of an outside critic.

The section on Ion-Action and Salt Action under the heading of "Salts of Light Meta's, Alkilis, Acids, Halogens, Oxidizers," etc., is an exceptionally clear and comprehensive presentation of this subject.

It differs from similar text-books of America and England in some of its teachings. It should appeal to any physician who cares to inform himself of the Continental methods of therapy.

The author has made himself thoroughly familiar with modern literature and gives due credit regardless of nationality.

Oxford Medical Publications. War Blindness at St. Dunstan's. By Sir Arnold Lawson, K.B.E., M.D., F.R.C.S., L.R.C.P., Senior Ophthalmic Surgeon and Lecturer on Ophthalmic Surgery, Middlesex Hospital; Late Surgeon, Royal London Pphthalmic Hospital, etc. 148 pages. New York: Oxford University Press.

The present volume is an account of the work done at St. Dunstan, the hospital given over to the treatment of the British war blind from 1914 to 1920. It is based upon the observations of 1,344 officers and enlisted men.

The work is presented in the form of case reports, with discussions of each case and the type of eye disorder represented. The author's remarks on syphilis as related to the eye are of especial value.

The book should prove helpful to the ophthalmologist and to those interestde in industrial injuries to the eye.

Applied Psychology for Nurses. Lippincott's Nursing Manuals. An Introduction. By Donald A. Laird, Assistant Professor of Psychology, University of Wyoming; Lecturer in Nursing Psychology, Invinson Memorial Hospital School of Nursing. 47 text figures. 236 pages. Philadelphia and London: J. B. Lippincott Co., 1923. Cloth, $2.50.

The author has written a very complete book from an elementary point of view and has well explained the basic principles of psychology. He wisely stresses the importance of the nurse's knowing herself as well as her patient psychologically.

The book should prove an addition to the text books of nursing and could with advantage be added to the list of any training school.

Southern Medical News

ARKANSAS

Jackson County Medical Society has elected Dr. Walter Stallings, President; Dr. J. H. McCurry, Vice-President; Dr. M. L. Harris, Secretary-Treasurer.

The Masonic order of the State is planning to build a $50,000 fire-proof building at the State Sanatorium for Tuberculous Children. When completed the capacity of the sanatorium will be 300.

The last session of the Arkansas Legislature appropriated $75,000 for additional buildings at the State Tuberculosis Sanatorium, Booneville. The capacity will be 260 beds. There was also an appropriation of $75,000 to establish a tuberculosis sanatorium for negroes.

Deaths

Dr. W. S. Muldrow, Mineral Springs, aged 73, died suddenly May 2 from heart disease.

Dr. Rufus S. Rice, Rogers, aged 60, died March 21 from uremia and chronic nephritis.

Dr. R. B. Gibson, Cherry Valley, aged 67, died at St. Josep'h Hospital, Memphis, Tenn., May 19 from heart disease.

Dr. William D. Alford, Murfreesboro, aged 87, died suddenly May 12 from heart disease.

DISTRICT OF COLUMBIA

At a meeting of the Board of Education, Washington, it was decided that provisions for more extensive medical inspection in the public schools will be sought in next year's budget, if the board can obtain the support of the local social service agencies interested in the work.

Dr. Hugh S. Cumming, Surgeon General of the U. S. Public Health Service, has gone to Geneva, Switzerland, to arrange collaboration of the League of Nations' international health work with the United States.

Deaths

Dr. Michael Joseph Ready, Washington, aged 44, died May 19 following a long illness.

Dr. Randolph Breese Brummett, Washington, aged 53, died at the Emergency Hospital May 7 from heart disease.

Dr. William Holland Heron, Washington, aged 56, died May 12.

FLORIDA

The Florida Railway Surgeons' Association has elected Dr. Henry C. Dozier, Ocala, President; Dr. Julius C. Davis, Quincy, Vice-President; Dr. Edmund W. Warren, Palatka, Secretary.

Deaths

Dr. Howard Switzer, Miami, aged 73, died May 26.

Dr. Theophilus West, Marianna, aged 87, died April 10 from senility.

GEORGIA

Butts County Medical Society has elected Dr. H. W. Copeland, President; Dr. A. F. White, Vice-President; Dr. J. Lee Byron, Secretary-Treasurer.

Dougherty County Medical Society has elected Dr. A. W. Wood, President; Dr. N. E. Benson, Vice-President; Dr. W. S. Cook, Secretary-Treasurer.

Floyd County Medical Society has elected Dr. J. L. Garrard, President; Dr. W. B. Floyd, Vice-President; Dr. M. M. McCord, Secretary-Treasurer.

Gordon County Medical Society has elected Dr. R. M. Gray, President; Dr. W. R. Richards, Vice-President; Dr. Z. V. Johnston, Secretary-Treasurer.

Hart County Medical Society has elected Dr. G. T. Harper, President; Dr. A. O. Meredith, Vice-President; Dr. T. R. Gaines, Secretary-Treasurer.

Jasper County Medical Society has elected Dr. R. F. Cary, President; Dr. L. Y. Pittard, Vice-President; Dr. J. W. Payne, Secretary-Treasurer.

Ocmulgee Medical Society has elected Dr. J. M. Smith, President; Dr. W. A. Coleman, Vice-President; Dr. W. H. Pirkle, Secretary-Treasurer.

Polk County Medical Society has elected Dr. E. H. Richardson, President; Dr. G. M. White, Vice-President; Dr. S. L. Whitely, Secretary-Treasurer.

Screven County Medical Society has elected Dr. A. D. Lewis, President; Dr. Louis Hannah, Secretary; Dr. L. F. Lanier, Treasurer.

Tattnall-Evans County Medical Society has elected Dr. Dan S. Clanton, President; Dr. J. C. Harris, Vice-President; Dr. J. C. Collins, Secretary-Treasurer.

Ware County Medical Society has elected Dr. W. F. Reavis, President; Dr. D. M. Bradley, Vice-President; Dr. J. E. Penland, Secretary-Treasurer.

Dr. Victor H. Bassett, Savannah, has been elected Health Officer of Tybee.

The Good Samaritan Clinic, devoted exclusively to disorders of the ductless glands, was recently opened in Atlanta. It is supported by a group of prominent capitalists who form its board of trustees. Twenty physicians and an orthodontist compose its medical staff.

Drs. Albert L. Crittenden, Shellman, and Frederick D. Petterson, Culbert, have been appointed members of the State Board of Health.

Deaths

Dr. James Wallace Van Dusen, Fort Benning, aged 52, died at the Walter Reed General Hospital, Washington, D. C., May 2 from ileus paralyticus.

Dr. Silas W. Arrowood, Atlanta, aged 64, died April 22 at a local sanatorium.

Dr. Robert Warren Colquite Green, College Park, aged 72, died March 20 from chronic nephitis.

KENTUCKY

The Northeastern Kentucky Medical Association has elected Dr. Z. T. Thompson, Pikeville, President; Drs. M. B. Wicker, Meeksburg, G. B. O. O'Roarke, Grayson, G. E. Johnson, Jenkins, Vice-Presidents; Dr. C. E. Downs, Ashland, Secretary; Dr. H. G. Morris, Greenup, Treasurer.

Muhlenberg County Medical Association has elected Dr. E. L. Gates, President; Dr. H. Tyldsley, Vice-President; Dr. W. McNeil, Secretary.

Bullitt County Medical Society has elected Dr. G. W. Kirk, President; Dr. R. J. Kerr, Vice-President; Dr. R. L. Hackworth, Secretary-Treasurer.

Nicholas County Medical Society has elected Dr. W. H. Martin, President; Dr. L. K. Swango, Vice-President; Dr. C. W. Kash, Secretary.

The University of Louisville has acquired a new $270,000 campus of about 40 acres, to which the College of Arts and Sciences will be moved within two years and on which new buildings will be erected. An agreement has been made between the city and school authorities by which the professional administration of the Louisville City Hospital is given over entirely to the University.

Owners of the Brosheer-Brummett Hospital, Middlesborough, are planning to build two two-story buildings adjoining the hospital.

A memorial to Dr. Sidney J. Meyers, who died recently, may be raised by voluntary subscription. E. S. Tachau has been named chairman of the committee sponsoring the memorial. The form of the memorial will be decided upon later.

Deaths

Dr. Sidney Johnston Meyers, Louisville, aged 50, died May 28 at St. Joseph's Infirmary, following an operation.

Dr. William Henry Coleman, Louisville, aged 53, died May 17 from cerebral hemorrhage.

LOUISIANA

Dr. George E. Beyer, entomologist of the State Board of Health, New Orleans, has been granted a leave of absence to go to San Domingo to assist in stamping out malaria.

Dr. John F. McHugh, Mansfield, has resigned as Health Officer of DeSoto Parish.

Deaths

Dr. James Duffield Toy, De Ridder, aged 46, died May 2.

MARYLAND

Dr. Howard A. Kelly recently presented a Della Robbia Bambino to the Babies' and Children's Clinic at the University of Maryland.

(Continued on page 36)

The **worst** cases of Osteomyelitis are the **best** cases for ALKANITE.

As an adjunct to good surgery "Alkanite" ranks with Dakin's.

In 1/4-lbs. at $1.50 thru your druggist.

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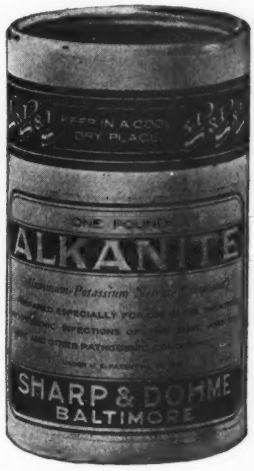

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ACRIFLAVINE has been shown to be a more powerful antiseptic, in serum, than bichloride or phenol.

SOLUTABS ACRIFLAVINE P-M CO are superior to other forms of the chemical for medicinal use, in that

They are more quickly soluble.
They permit use of freshly made solutions.
They yield solutions of accurate strength.
They avoid staining hands or clothing in making solutions.

Each Solutab contains Acriflavine 1-37/100 grs., making 3 ozs., of solution 1:1000 (proper injection strength) or 1 pint of solution suitable for lavage.

Acriflavine in dilution of one part to 300,000 of protein-containing media, has been shown to inhibit the development of Gonococci: in proper strengths it is practically non-irritant and does not decrease phagocytic action. Its results in Specific Urethritis are superior to the generally used antiseptics. It is indicated in a wide range of conditions caused by pathogenic organisms.

Solutabs Acriflavine 1-37/100 grs., P-M Co are hand-moulded, disintegrate quickly and dissolve readily. Supplied in packages of 5 tubes of 10 tablets each. Write for literature.

PITMAN-MOORE COMPANY
Chemists
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Burdick Infra-Red Compress applied to shoulder for "mild-prolonged" application.

Infra-Red Radiant Energy

No other local application of *radiant energy* is comparable with the INFRA-RED RAYS.

The Infra-Red Rays are converted into heat in the deeper tissues, effecting increased vascularity, cellular massage and maintaining active catabolism and anabolism with regression of oedema.

The Burdick Infra-Red Generators enable the physician to give either "short intensive" or "mild prolonged" applications of these long-wave, deeply penetrating rays with ease, certainty and comfort to the patient.

These Generators can be attached to any light socket, are absolutely safe to use, under perfect control and are indicated in a wide range of ailments.

The introduction of this form of physiotherapy is so important and the clinical results already obtained are so promising that we have gathered all the available information in an exhaustive and interesting treatise.

The first edition of this book—entitled "*Infra-Red Therapy*" will be sent free to any physician on request.

Burdick Cabinet Company

Manufacturers of Light Therapy Equipment

400 Madison Ave. Milton, Wisconsin

(Continued from page 570)

Dr. William M. Dabney, Ruxton, and Mrs. Elizabeth Martin Brown, Baltimore, were married at Media, Pa., on May 10.

Deaths

Dr. William Alfred Belt Sellman, Baltimore, aged 72, died May 10, following a long illness.

MISSISSIPPI

Deaths

Dr. Washington L. Lee, Petal, aged 71, died May 6.

MISSOURI

The Western Electro-Therapeutic Association, at its recent meeting in Kansas City, elected the following officers:: Dr. H. H. Bowing, Rochester, Minn., President; Drs. E. H. Skinner, Kansas City, and A. D. Willmoth, Louisville, Ky., Vice-Presidents; Dr. Charles Wood Fassett, Kansas City, Secretary; Dr. W. P. Grimes, Kansas City, Treasurer. Next meeting will be held in Kansas City.

A $500,000 Maternity Hospital will be established at the Washington University School of Medicine. It will be an eight-story building and will have a 250 bed capacity instead of a 33 bed capacity as at present.

The Lloyd Building, one of the three additions to the Missouri State Sanatorium, Mt. Vernon, was recently dedicated.

Dr. Montrose T. Burrows, Associate Professor of Experimental Surgery, Washington University School of Medicine, St. Louis, has announced that the animal quarters of that institution are being enlarged to accomodate more than twice the present capacity.

Dr. E. E. Brunner, Superintendent of the State Hospital No. 4, Farmington, has been transferred to the superintendency of the colony for feeble-minded and epileptics at Marshall.

Dr. Francis E. Cullen, senior physician at the City Hospital, St. Louis, has been appointed Superintendent of the Isolation Hospital, succeeding Dr. Eugene A. Scharff, who was appointed Superintendent of the City Hospital.

(Continued on page 38)

FOLLOWING PAUL EHRLICH

THE supreme importance of the arsphenamines is in their trypanocidal power. Lightning-like solubility of a drug solely affects the convenience of administration.

The combination of maximum trypanocidal value and of proper and complete solubility has been conserved in the production of

SALVARSAN
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in conformity with the theories, formulas and processes of the discoverer, Paul Ehrlich.

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Dupli-Tized X-Ray Film

Super Speed

Not only will this truly Super Film be found to be 2½ to 3 times faster than standard Dupli-Tized Films for *Screen Work* but also for *Direct Exposures without screens* the speed is 20% greater than in the standard film.

At your dealer's now. No advance in price.

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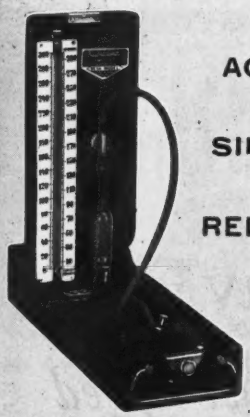

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"STANDARD FOR BLOODPRESSURE"

WHEN a work of any description is acknowledged to be supreme in its field, there are invariably those who imitate and claim equality with it, and who seek to profit through its high repute. This is not unusual for it inevitably befalls any product which enjoys the reputation of being exceptionally fine.

SUCH efforts to duplicate the original never attain to the skill and the deep, inner excellence that give it distinction; and by the natural law that the follower can never be the leader they are forever barred from reaching the goal so unwisely sought. The doctor, sitting in impartial judgment, is not deceived by unsupported claims, and does not accept them as a substitute for performance.

YOUR DEALER HAS THE BAUMANOMETER IN STOCK

W. A. BAUM CO., INC.
100 FIFTH AVENUE - NEW YORK

(Continued from page 36)

Dr. H. T. Leach, Elston, has been appointed County Physician.

Dr. C. P. Fryer, Maryville, Nodaway County Health Officer, has been appointed City Health Officer.

The Morgan County Physicians' Protective Association was recently organized in Versailles. Dr. Wm. Well was elected President; Dr. H. N. Lutman, Secretary. The object of the association is a united effort to improve collections for medical services rendered.

Dr. R. Emmet Kane, St. Louis, and Miss Grace Cantwell, Madison, Wis., were married May 1.

Dr. Lawrence M. Riordan, St. Louis, and Miss Carolina Robinson Hardy, Waterloo, Ill., were married May 10.

Dr. W. H. Allen and Mrs. Agnes Brown, both of Rich Hill, were married May 23.

Dr. Lee Petit Gay, St. Louis, and Miss Ruth Bradfield, Abilene, Tex., were married April 22.

Deaths

Dr. Albert P. Mitchell, Bolivar, aged 62, died May 16 at a hospital in Springfield.

Dr. James William McClanahan, Forest City, aged 68, died recently at the Ensworth Hospital, St. Joseph, from carcinoma of the stomach and liver.

Dr. Fritz E. Skinner, DeSoto, aged 52, died April 22 from sepsis, due to a dento-alveolar abscess.

Dr. Charles W. Pyle, Kansas City, aged 56, died May 5 from heart disease.

Dr. Marshall Ney Smith, St. Louis, aged 63, died May 14 from cerebral hemorrhage.

Dr. John J. Mayfield, Jackson, aged 60, died May 21 from Bright's disease.

Dr. William C. Etherton, Missouri City, aged 45, died May 25.

Dr. Bryan Connor Axtell, Kansas City, aged 67, died May 29.

NORTH CAROLINA

Dr. Alonzo Myers, Charlotte, announces the association with him in the practice of orthopedic surgery of Dr. J. Stuart Gaul. A clinic, known as the Alonzo Myers Orthopedic Clinic, Inc., has been opened.

Dr. William E. Warren and Miss Deborah Fleming, both of Williamstown, were married at Norfolk, Va., April 30.

(Continued on page 40)

Bran is Hidden

In those delicious flakes

Pettijohn's is soft rolled wheat—a special wheat—the most flavory wheat that grows. Everyone enjoys it.

These delicious flakes hide 25% of bran, yet the bran is hardly noticed.

Thus Pettijohn's combines whole wheat and bran in its most delightful form. It is a favorite morning dainty.

Package Free—to physicians on request.

Pettijohn's

Rolled Wheat—25% Bran

The Quaker Oats Company, Chicago

Answering an Important Question

The Question—"Why is it possible to feed S. M. A. with good nutritional results to normal, full-term infants of varying ages (from birth to one year, or even longer if desired), without dilution or change?"

The Answer—This is possible because S. M. A. resembles breast milk, both physically and chemically, in all important respects. In other words, S. M. A. resembles breast milk not only in the quantity of protein, carbohydrate and salt—it also resembles breast milk so closely in the *character* of its *fat* that it is possible for S. M. A. to contain the same *quantity* of fat as breast milk. S. M. A. is also markedly anti-rachitic and anti-spasmophilic. S. M. A. thus offers the physician a means of supplying infants of all ages with the food elements in the same proportion as they would obtain them from breast milk. And this is why, in feeding S. M. A., it is only necessary to increase the *amount* of the prepared food as the infant grows.

S. M. A. is sold by druggists on the order of a physician. If you cannot obtain it from your druggist, please give us his name, and we will furnish you direct till he gets a supply. Complete literature for physicians on request—THE LABORATORY PRODUCTS CO., 1111 Swetland Bldg., Cleveland, Ohio.

A FOOD TO KEEP BABIES *and* YOUNG CHILDREN WELL

Adapted to Mother's Milk

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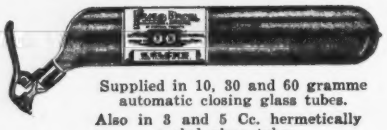
For Local and General
ANESTHESIA



Supplied in 10, 30 and 60 gramme automatic closing glass tubes.
Also in 3 and 5 Cc. hermetically sealed glass tubes.

The automatic closing tubes require no valve. Simply press the lever.

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Sole distributors for the U. S. and Canada
MERCK & CO.
St. Louis **New York** Montreal

(Continued from page 38)

Deaths

Dr. Richard Hall Johnston, Wilson, aged 52, died May 13 from chronic nephritis at a local hospital.

Dr. William H. Wilson, Lenoir, aged 60, died April 15 at Morgantown from cerebral hemorrhage.

OKLAHOMA

The Oklahoma State Medical Association, at its recent meeting, elected the following officers: Dr. Ralph V. Smith, Tulsa, President; Dr. Everett S. Lain, Oklahoma City, President-elect; Drs. Chas. H. Ball, Tulsa, A. L. Blesh, Oklahoma City, and George S. Baxter, Shawnee, Vice-Presidents; Dr. Claude A. Thompson, Muskogee, Secretary-Treasurer.

The Henryetta Medical Society, Henryetta, was recently reorganized. Dr. G. Y. McKinney was elected President; Dr. G. A. Kilpatrick, Vice-President; Dr. Hugh H. Monroe, Secretary-Treasurer.

A group of physicians at Oklahoma City are anticipating the construction of a building to be used exclusively by physicians and dentists.

Dr. G. M. Clifton, Norman, has been appointed Health Officer for Cleveland County.

Dr. O. W. Starr, Drumright, was recently reappointed City Physician.

Dr. William A. Fowler, Oklahoma City, and Miss Virginia Tolbert, Hobert, were married April 29.

Deaths

Dr. William L. B. McKelvy, Drumright, aged 61, died May 11 from pneumonia.

SOUTH CAROLINA

Darlington County Medical Society has elected Dr. O. A. Alexander, President; Dr. W. L. Byerley, Vice-President; Dr. J. T. Coggshall, Secretary; Dr. J. W. Wilcox, Treasurer.

The Southern Railway Surgeons' Association met in Charleston recently. Dr. Edward T. Newell, Chattanooga, Tenn., was elected President.

(Continued on page 42)

Laboratories of

Drs. Bunce, Landham and Klugh

ATLANTA, GEORGIA

DEPARTMENTS

PATHOLOGY	BACTERIOLOGY and SEROLOGY	X-RAY and RADIUM
Allen H. Bunce, A.B., M.D., F.A.C.P.	George F. Klugh, B.S., M.D.	Jackson W. Landham, M.D.

These laboratories are equipped for making every test of clinical value in the diagnostic study of medical and surgical cases. Only standardized methods and technique are used.

In addition to the diagnostic study of cases there are adequate facilities for the x-ray and radium treatment of conditions in which these forms of treatment are indicated.

Fee lists and containers for pathological specimens and information in reference to x-ray and radium work furnished upon request.

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Constitutes the Bulk of Ophthalmic Practice

And the results are judged by the glasses that the patient wears. So that accurate Prescription Work is of the first importance.

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Everything that up-to-date methods and personal oversight can accomplish in the way of Accuracy and Promptness you will find in

OUR MAIL PRESCRIPTION SERVICE.

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Anti Rabic Virus

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You can treat your Rabies cases at home and thus help your patient economize in time and money. The product is uniform. It establishes a high degree of immunity. It is harmless. The treatments are free from complications. Reactions are less.

Anti Rabic Virus, Terrell, has been used in over 1,000 cases with success and without deleterious effect in any instance. It is available for prompt institution of treatment, at the following Laboratories:

TERRELL'S LABORATORIES

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FORT WORTH
(Texas State Bank Building).

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(Medical Arts Building).

RANGER
(Terrell Building).

TULSA
(Richards Building).

MUSKOGEE
(Surety Building).

OKLAHOMA CITY
(Bailey-Terrell Laboratories).

EL PASO
(Turner's Clinical Laboratory).

TOPEKA, KANSAS
(Lattimore Laboratory).

(Continued from page 40)

TENNESSEE

The West Tennessee Medical and Surgical Association recently met in Dyersburg. The following officers were elected: Dr. E. H. Baird, Dyersburg, President; Dr. S. M. Herron, Jackson, Vice-President; Dr. I. A. McSwain, Paris, Secretary; Dr. George McSwain, Paris, Assistant Secretary. The next meeting will be held in Jackson.

A gift of $10,000 to the Meharry Medical College Endowment Fund from Herman E. Perry, President of the Service Foundation of Atlanta, has been announced by the board of trustees of the institution.

Dr. Fenton L. Husbands, Memphis, has been appointed Superintendent of the Blytheville Hospital, Blytheville, Ark.

Deaths

Dr. Jasper Kelsey, Nashville, aged 84, died April 26 at Fort Meade, Fla.

Dr. E. H. Knight, Granville, aged 83, died May 29.

Dr. James C. Clay, Alamo, aged 72, died May 18.

(Continued on page 44)

Dr. H. H. Kinney's Infirmary

OKOLONA, MISS.

Has recently added the Original Battle Creek Treatments and an Electrotherapy Department. For further information address Dr. Kinney's Infirmary, Okolona, Miss., Mrs. Juliet King, Secy.

A STANDARD
American Product
(Free From Alcohol)
For Preparing
MALT SOUP

Of recognized value in the treatment of infants suffering from marasmus, atrophy and malnutrition.

Typical Malt Soup results are obtained by using **BORCHERDT'S MALT SOUP-EXTRACT**, usual weight increase, marked change in character of stools and generally a satisfactory improvement. **BORCHERDT'S MALT SOUP-EXTRACT** is composed solely of Malt Extract and Potassium Carbonate in their correct proportion, according to the original Malt Soup Formula.

Samples and Literature on Request

BORCHERDT MALT EXTRACT CO.
217 N. Lincoln St. CHICAGO, ILL.

Considered from an economic standpoint, the cow gets away with petit larceny!

She gives milk which sells for 10 cents per quart, and 88% of it is nothing in the world but water!

DRYCO—on the other hand—is pure cow's milk deprived of its water by the rapid drying (Just's) process, 212°F. for two seconds.

DRYCO supplies Protein 32%, Lactose 46%, Fat 12%, Salts 7%; one oz. supplies 127 Calories. **DRYCO** is stable and sterile. Its casein in colloidal form is easily digested. Its fat is quickly assimilable. Its taste is pleasant, its preparation simple.

DRYCO is the nutrient par excellence for the feeding of ACUTELY ILL, CONVALESCENT, INVALID AND CACHECTIC patients as well as for THE EFFICIENT FEEDING OF INFANTS.

Send for sample, literature, directions, feeding tables, also booklet, "The Doctor's Rubaiyat."

THE DRY MILK CO. 18 Park Row NEW YORK CITY

"An International Institution for the Study and Production of Pure Milk Products."

Iodide Difficulties

Avoided by

SAJODIN

Pleasant and convenient to take (tablets). No gastric distress. Virtually free from iodism. Better utilized than the iodides. Especially indicated for

Enlarged Glands **Goiter**
Chronic Arthritis **Arteriosclerosis**

FERRO-SAJODIN Tablets agreeably and efficiently replace syrup of iodide of iron.

IOTHION-OIL for local iodin therapy—highly penetrating and stainless—not merely a counter-irritant.

Literature on request

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WINTHROP PRODUCTS
Conform to Original BAYER High Standards

Oats—2465

Bread, 1060 Meat, 1460

Professor H. C. Sherman, in his "Chemistry of Food and Nutrition," gives composite ratings to various foods, based on a new system of scoring. This system is based on calories, protein, phosphorus, calcium and iron.

Oats are rated at 2465—highest of all the grain foods quoted. And higher than any other food save hard American cheese.

Quaker Oats holds supreme place the world over, due to exquisite flavor. It is flaked from only the finest grains—just the rich, plump, flavory oats. We get but ten pounds from a bushel. This super-quality makes the oat dish delightful.

Quaker Oats

The Extra-Flavory Flakes

(Continued from page 42)

TEXAS

At the recent meeting of the Texas State Medical Association, held in Fort Worth, the following officers were elected: Dr. A. C. Scott, Temple, President; Dr. M. F. Bledsoe, Port Arthur, President-elect; Drs. Jasper N. White, Texarkana, Alonzo A. Ross, Lockhart, John W. Torbett, Marlin, Vice-Presidents; Dr. Holman Taylor, Fort Worth, Secretary. The next meeting will be held in San Antonio.

The new Homan Sanatorium, to be erected on Mount Franklin, El Paso, will cost approximately $150,000. It will be a five-story building and will have 128 rooms.

The cornerstone of the chemical laboratory of the Rice Institute, Houston, was laid June 4. The laboratory will be erected at an approximate cost of $1,000,000 and will be ready for occupancy September, 1924.

(Continued on page 46)

CLASSIFIED ADVERTISEMENTS

INTERNES WANTED—Two for anesthetic service. University Hospital, Iowa State University. Service begins July 1st, 1923. Exceptional advantages for training in anesthtetic technique. Full maintenance and bonus of $125.00 for completed year. Superintendent, University Hospital, Iowa City, Iowa.

WANTED—Physician for hospital work in small town in Virginia; must be capable of doing x-ray and laboratory work. Reply, state salary wanted and references. Address K. B. H., care Journal.

INTERNES WANTED—Iowa State University Orthopedic Service, three Internes to begin services on first of July, 1923. Service 120 beds, both children and adults. Excellent opportunity for training. Terms: Full maintenance and bonus of $125 for completed year. Only hard workers need apply. Dr. A. Steindler, University Hospital, Iowa City, Iowa.

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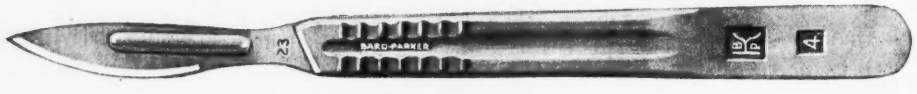

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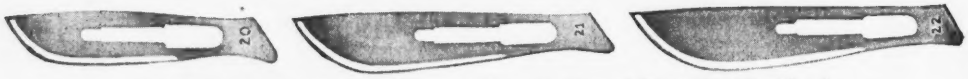

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Sole licensees to manufacture in the U. S. A.
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The American production is identical with the French. Orders repeated with increasing quantities, emphasize tho unqualified approval of Novarsenobenzol Billon since its re-introduction into the United States.

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You Have A Voice in the Selection of Your Local Legal Counsel

Clause "D" of the Medical Protective Contract says:

Upon receipt of notice the company shall immediately assume full responsibility for the defense of any such claim or suit and shall retain local legal counsel, IN WHOSE SELECTION THE HOLDER HEREOF SHALL HAVE A VOICE, who, in conjunction with the legal department of the company, shall defend without expense to the holder hereof.

And the Doctor says:

"As you are aware, I was made a co-defendant in this suit with another physician, who carried other protection. I am sure you can realize what vastly greater relief I felt than he throughout the entire proceedings, where damages to the extent of fifty thousand dollars were claimed.

"HE HAD NO CHOICE IN THE NAMING OF LOCAL COUNSEL, ANOTHER POINT THAT I HAPPEN TO KNOW CAUSED HIM SOME EMBARRASSMENT."

A Medical Protective Contract assures you of expert defense and personal service, rendered by the only corps of legal specialists in malpractice in existence, who devote their entire time to the interests of the contract holders of this company.

THE MEDICAL PROTECTIVE CO.
of
Fort Wayne, Indiana.
Professional Protection Exclusively.

(Continued from page 44)

Dr. Albert Woldert, Tyler, and Miss Eva Buford, Henderson, were married May 6.

Deaths

Dr. Willis R. Smith, El Paso, aged 50, died suddenly April 29.

Dr. Charles Adam Reinemund, El Paso, aged 40, died May 7.

Dr. Robert Lee Combs, Cooper, aged 58, died May 6.

VIRGINIA

The Accomac County Medical Society held its first meeting since 1919 at Olney, May 8. The following officers were elected: Dr. Joseph L. DeCormis, President; Dr. William M. Burwell, Vice-President; Dr. John W. Robertson, Secretary-Treasurer.

A drinking fountain will be erected in Winchester as a memorial to the late Dr. Godfred L. Miller. The approximate cost will be $2,000, of which $1,400 has already been raised.

Dr. Louis L. Williams, Jr., Richmond, with the State Department of Health, has been appointed to represent the United States on the epidemic committee of the League of Nations. Dr. Williams will spend four months in Italy studying malarial problems.

Dr. Joseph A. White, Professor of Ophthalmology, Medical College of Virginia, Richmond, will have charge of the combined chairs of ophthalmology, otology, rhinology and laryngology.

WEST VIRGINIA

Dr. Duvall, who has been in charge of the Logan County Health Bureau, has resigned and been succeeded by Dr. Almon P. Goff, of the U. S. Public Health Service.

Dr. Withrow Morse, Professor of Physiological Chemistry in West Virginia University School of Medicine, has been elected to the position of Professor of Physiological Chemistry and Toxicology in the Jefferson Medical College.

Dr. C. W. Kidder, Grafton, has been appointed County Health Officer of Taylor County.

Deaths

Dr. A. Fletcher Haynes, Huntington, aged 62, died recently from influenza.

BRAND'S BREWERS' YEAST

Vitamin B. is a most essential ingredient of the diet. Bailey, of the Connecticut Agricultural Experiment Station, has shown that with Vitamin B. absent from the diet, the appetite fails, food intake is diminished and body weight declines. Experiment animals recovered promptly when brewers' yeast was added to the diet.

Brewers' yeast is rich in the water soluble or Vitamin B. content.

BRAND'S BREWERS' YEAST is a dry brewers' yeast, containing no excipient or admixture of foreign substance. It is stable, palatable and being marketed in capsules only, it is a convenient form for administering brewers' yeast. It maintains its potency indefinitely because it is a "live" yeast. Its full nitrogen content is 8.89 per cent, of which 5.6 per cent is water soluble nitrogen.

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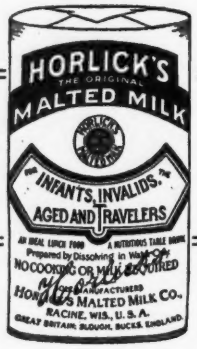
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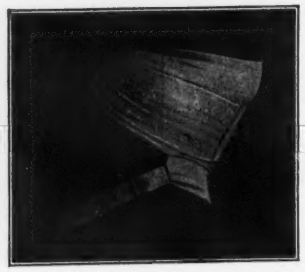

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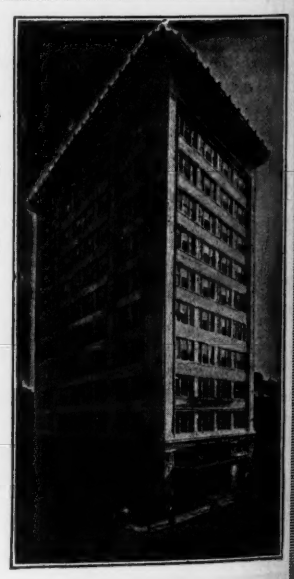

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